

THE SUBFAMILY LEEUWENHOEKINAE IN THE NEOTROPICS (ACARINA: TROMBICULIDAE)¹

by

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ABSTRACT

Neotropical representatives of the subfamily Leeuwenhoekinae are reviewed. The genus *Odontacarus* comprises 66 percent of the chiggers examined, and 82 percent of this genus were identified as *O. tubercularis* (Brennan). The following genera are redescribed: *Albeckia* Veracammen-Grandjean and Watkins, *Leeuwenhoekia* Oudemans, *Odontacarus* Ewing, *Sasacarus* Brennan and Jones, *Wagenaarina* Brennan, and *Whartonia* Ewing. New taxa are: *O-*

dontacarus comosus comosus, *O. c. novemsetus*, *O. dienteslargus*, *O. pugnusus*, *O. schoenesetosus*, *O. sunniana*, *O. tiptoni*, *O. tuberculohirsutus*, *O. vanderhammeni*, *O. vergrandi*, *Sasacarus furmani panamensis*, and *Whartonia angulascuta*. *Odontacarus fieldi* Brennan and Jones, 1961, and *O. cayolargoensis* Brennan, 1959, are synonymized under *O. tubercularis* Brennan, 1952. Keys to genera and species are provided.

INTRODUCTION

The larval trombiculid mites of the subfamily Leeuwenhoekinae are parasitic on small mammals, reptiles, amphibians, and occasionally birds. The subfamily is worldwide in distribution. Nine genera and subgenera are endemic to the neotropical region.

Since erection of Leeuwenhoekinae in 1944, revisionary works have been restricted either to discrete geographical areas other than the neotropics or to discussions on the generic level only. A study of more than 15,000 chiggers from Venezuela has emphasized the need for a comprehensive review of the leeuwenhoekinae chigger fauna of the neotropical region.

This paper is based on examination of more than 1,700 larvae, mostly off small mammals. Eight genera and subgenera and 28 species (12 of them new) are represented. Supraspecific taxa are redescribed primarily on the basis of neotropical representatives; and specific redescriptions, with 3 exceptions, are based on type material. Figures are included if illustrations

accompanying earlier descriptions are considered inadequate. The genus *Hannemania* Oudemans, 1911, is not discussed.

Measurements, in addition to the standard measurements, include AMA—length of accessory branch on anterosubmedian scutal setae; AMB—the distance between the 2 anterosubmedian scutal setae; the distance between the 2 setae on coxa I; and the total length of the cheliceral blades. The length of the nasus is measured from the point of attachment of the projection to the scutum, and the length of the idiosoma is measured from the posterior margin of the cheliceral bases to the posterior margin of the idiosoma. A genuala formula indicates the number of genualae per genu for legs I, II, and III, respectively (i.e. 2+, 1+, 1). The + indicates presence of a microgenuala. A similar formula is used to indicate the number of tibialae and microtibialae on legs I, II, and III. All measurements are in micrometers.

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SYSTEMATIC SECTION

Subfamily *Leeuwenhoekinae* Womersley

Leeuwenhoekinae Womersley, 1944:102 [Type genus: *Leeuwenhoekia* Oudemans, 1912, original designation].

Leeuwenhoekidae Womersley, 1945:96; Vercammen-Grandjean, 1968:119.

Leeuwenhoekinae: Wharton, 1947:381; Fuller 1952:227; Vercammen-Grandjean, et al., 1973:60.

Leeuwenhoekinae: Hsu and Wen, 1963:47.

Diagnosis: Larvae lacking palpotarsal subterminala, with 2 anterosubmedian scutal setae,

bisetose coxa I, leg segmentation 6-6-6*, and microgenuala II present.

Redescription: Larvae parasitic on small mammals, reptiles, amphibians, and occasionally birds. Scutum with 2 each, anterosubmedian setae, anterolateral and posterolateral setae; nasus present or absent. Palpotarsus lacking subterminala. Eyes present. Leg segmentation 6-6-6; coxa I bisetose; genu I, II, and III each with 4 branched setae; leg I usually lacking parasubterminala; microgenuala II present. Tracheae and spiracles present or absent.

Key to the Genera

1. Nasus present, spiracles and tracheae present 2
Nasus lacking, spiracles and tracheae present or absent 3
- 2(1). Cheliceral blades with tricuspid cap only *Leeuwenhoekia*
Cheliceral blades with dorsal and/or ventral rows of teeth *Odontacarus*
- 3(1). Tracheae and spiracles absent *Wagenaarina*
Tracheae and spiracles present 4
- 4(3). Cheliceral blades with tricuspid cap only, basal inner margin of palpotibial claw denticulate *Sasacarus*
Cheliceral blades with dorsal and/or ventral rows of teeth, palpotibial claw not denticulate at base 5
- 5(4). Microgenuala and microtibiala stubby or clubbed, cheliceral teeth ventral only *Albeckia*
Microgenuala and microtibiala spiniform, cheliceral teeth dorsal and ventral *Whartonia*

Remarks: The subfamily was originally erected for *Leeuwenhoekia verduni*, 2 other species placed in that genus by Oudemans (1912), and 5 species placed in the genus by Womersley (1944). Womersley (1945) elevated the subfamily to full familial rank on the basis of tracheae and spiracles and included the type genus and 6 other genera. Familial rank was questioned by Wharton (1947) who considered the group as a trombiculid subfamily only. The group has recently been interpreted by Vercammen-Grandjean, et al. (1973, chart) as a family having over 27 genera and subgenera, including 7 genera containing species identified from areas of the neotropics.

Genus *Leeuwenhoekia* Oudemans

Leeuwenhoekia Oudemans 1910:88 [Type species: *Heterothrombidium verduni* Oudemans, original designation]; Oudemans, 1911:138;

Fuller 1952:234; Gould, 1956:14; Vercammen-Grandjean, et al. 1973:61

Diagnosis: Larvae with spiracles and tracheae; nasus present, cheliceral blades with dorsal apical tooth only; subterminala and parasubterminala absent from leg I. *Leeuwenhoekia* can be distinguished from the closely related genus *Comatacarus* Ewing, 1942, primarily by possession of tracheae and spiracles.

Redescription: Larvae neotropical, parasitic on small rodents and marsupials. Cheliceral blades with tricuspid cap only; palpotibial claw 5 pronged; palpal formula variable; galeala branched. Tracheae and spiracles present; scutum with broadly rounded posterior margin, sensillae probably flagelliform. Two genuala I, genuala II and III; 2 tibialae I and II and tibiala III; coxa I bisetose; coxae II and III unisetose; mastisetae lacking; onychotriches present. Dorsal and ventral setae moderately branched; 2 sternals present.

*One North American species of the genus *Comatacarus* has leg segmentation 7-6-6, the femur and telofemur fused.

Key to *Leeuwenhoekia* species

1. Sensillary bases anterior to posterolateral scutal setae, dorsal setae not bilaterally flattened *verduni*
2. Sensillary bases posterior to posterolateral scutal setae, dorsal setae bilaterally flattened *vercammeni*

Leeuwenhoekia verduni (Oudemans)

(Fig. 1)

Heterothrombidium verduni Oudemans 1910:88. [Holotype, larva; ex *Didelphis opossum*, South Brazil; Rijksmuseum van Natuurlijke Historie, Leiden].

Leeuwenhoekia verduni: Oudemans, 1911:138; Oudemans, 1912:74; Fuller, 1952:236; Brennan and Dalmat, 1960:183; Vercammen-Grandjean, et al., 1973:61.

Diagnosis: *L. verduni* differs from *L. vercammeni* in slender form of, and fewer idiosomal setae, and tuberculate setal bases. Other differences may be noted from the following redescription.

Redescription: Unassisted redescription of the holotype is restricted by its poor state of preservation (see remarks below). Descriptive information from Oudemans (1912) and Fuller (1952) is therefore included and parenthetically identified. *Idiosoma*: Broad ovoid, engorged; length and width 520 and 540; eyes 2/2 in ocular plates, anterior 17, posterior 10 μ m in diameter. Body setae generally densely branched with short setules, setal bases tuberculate. DF may be considered 2 (humeral) 4-2-4-4-2 or 4-4-4-4-2. VF, 2 ventrals, 10-10-2 pre-anals, 2 para-anals, 4 postanals plus 6 similar to dorsals. Spiracles present, tracheae visible to posterior margin of idiosoma. *Gnathosoma*: Palpal formula BBN_0NN (Fuller), palpal claw pentafurcate (Oudemans), or trifurcate (Fuller). Palpotarsus with 5 branched setae, 1 nude seta and tarsala (Oudemans, Fuller). Galeala with 3 branches; cheliceral blades obscured but apparently with minute tricuspid cap. *Scutum*: Shaped as figured by Oudemans (1912, Fig. R-3); sparsely punctate, PL stout but nonclavate; anterior margin relatively straight, posterior margin broadly rounded medially. AV-61, PW-84, SB-38, ASB-ca. 23, PSB-ca. 20, AMB-10, PL-34 (Fuller). *Legs*: Specialized setae as figured; coxal punctae small, sparse; tarsal claws with small barbs; empodium slender, lacking barbs. Leg index 818.

Distribution: Known only by the type specimen, South Brazil; E. A. Göldi, collector.

Specimens Examined: Holotype only.

Other Records: None.

Remarks: The holotype, labeled apparently in Oudemans's handwriting, was observed to be in extremely poor condition, due perhaps to some attempt to remount the specimen. Only 2 legs remain attached to the idiosoma (3 others are widely separated in the medium), the palpi are missing, only 3 dorsal setae remain, and only a partial posterolateral scutal seta remains on an anteriorly tipped scutum. The disputed furcation of the palpotibial claw, pentafurcate (Oudemans 1912:76) vs. trifurcate (Fuller 1952:237) cannot be resolved, nor can the number and kind of palpotarsal setae be verified. Both Oudemans and Fuller reported 5 branched setae and 1 nude seta plus a tarsala on the palpotarsus. Assuming that no nude palpotarsal setae other than the tarsala exist within the subfamily, Vercammen-Grandjean et al. (1973:61) reported 6 branched setae plus a tarsala (Vercammen-Grandjean, 1973, personal correspondence). Since phase contrast microscopy was not available to Fuller or Oudemans, the number of setae on the palpotarsus may be in doubt. The difference in number of these setae reported for *L. verduni* and *L. vercammeni* Brennan and Dalmat (5 branched and 1 nude as opposed to 7 branched) is therefore not considered grounds to place the 2 species in separate genera.

Leeuwenhoekia vercammeni

Brennan and Dalmat

(Fig. 2)

Leeuwenhoekia vercammeni Brennan and Dalmat, 1960:183. [Holotype, larva; ex *Heteromys d. desmarestianus*, Guatemala; Field Museum of Natural History, Chicago].

Diagnosis: *L. vercammeni* is easily distinguished from *L. verduni* by the bilaterally flattened dorsal setae, atuberculate setal bases, and more numerous idiosomal setae.

Redescription: *Idiosoma*: Broad ovoid, engorged. Length and width of holotype 723 and 452. Eyes apparently single, 12 μ m in diameter. Body setae somewhat bilaterally flattened, moderately branched, setal bases atuberculate; dorsal setae total about 87. Dorsal formula of paratype approximately 13-12-10-3-12-4-13-10-4-4-2.

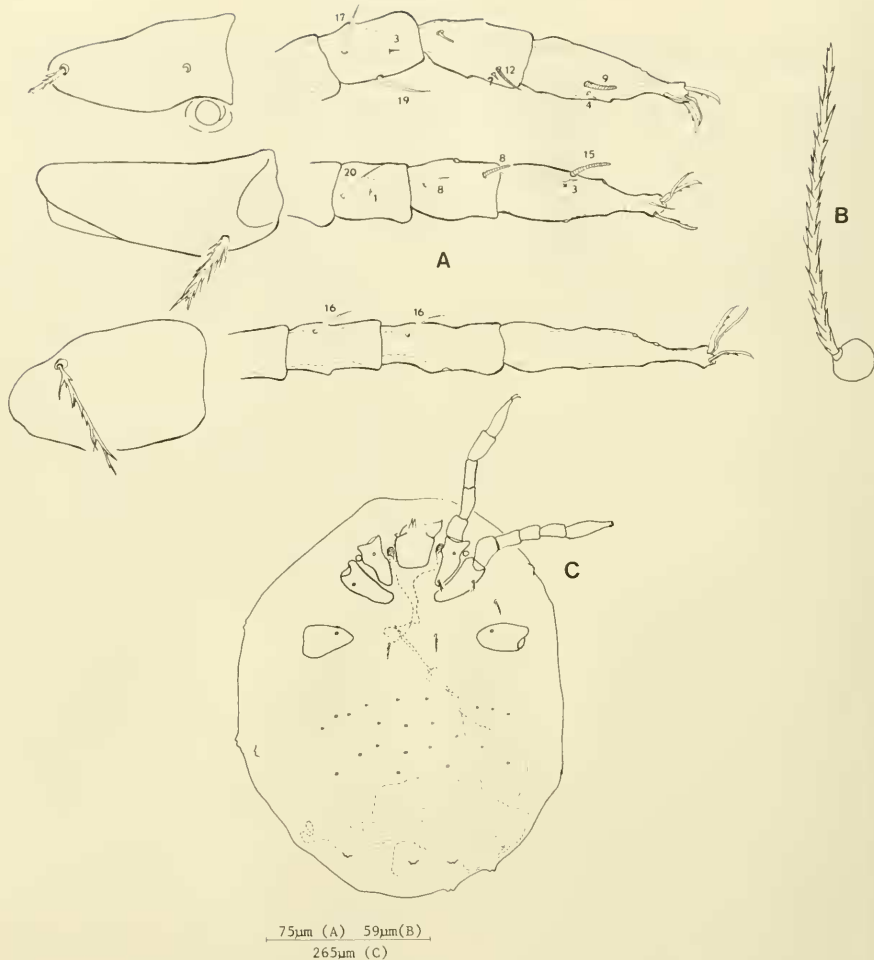


Fig. 1. *Lecuwenhoekia verduni*. A, leg segments showing specialized setae; B, dorsal setae; C, ventral aspect of idiosoma showing condition of holotype.

Ventral formula 2 sternals, 24 pre-anals, 36 post-anals. Spiracles present; portions of tracheae visible to posterior idiosomal margin. *Gnathosoma*: Cheliceral bases moderately punctate, palpal formula B/B/NNB; palpotarsus 7B plus tarsala; galeala basally stout, with long branches; claw long, pentafurcate. Cheliceral blades 39 μ m long, apically curved, with minute tricuspid cap. *Scutum*: Shaped as originally figured (Brennan and Dalmat, 1960:184, Fig. 1); AL's and PL's

stout, with long apparently caducous setules. Measurements of holotype (measurements of one paratype given in parentheses): AW-9S (100), PW-93 (96), SB-38 (49), ASB-33, PSB-24, AP-27 (31), AM-3S (45), AL- (ca. 56), PL- (58+). *Legs*: Coxae and specialized setae as originally figured. Genuala formula 2+,1+,1. Tibial formula 2+,2,1. Branched setae per leg segment listed sequentially for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,6,5; genu 5,4,4;

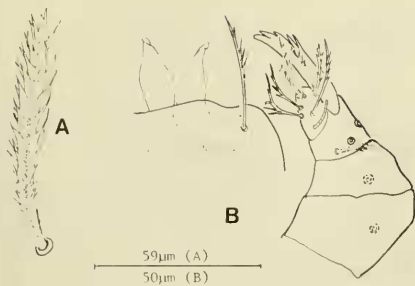


Fig. 2. *Leeuwenhoekia vercammeni* A, dorsal seta; B, palpus and cheliceral blades, ventral aspect.

tibia 8,6,6; tarsus 27,18,17. Leg index (paratype) 885.

Distribution: Known only from the holotype and 2 paratypes, Yepocapa, Dept. Chimaltenango, Guatemala.

Specimens Examined: Holotype and 2 paratypes, ex *Heteromys d. desmarestianus*, Yepocapa, Dept. Chimaltenango, Guatemala, 11 May 1948. Luis de la Torre, collector.

Other Records: None.

Remarks: Although only 3 specimens of the species are available for study, the close relationship of *L. vercammeni* to *L. verduni* is indicated by the form of cheliceral blades, stout scutal setae, and the presence of onychotriches.

Genus *Albeckia* Vercammen-Grandjean and Watkins

Albeckia Vercammen-Grandjean and Watkins, 1966:74 [Type species: *Albeckia albecki* Vercammen-Grandjean and Watkins, by monotypy]; Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Leeuwenhoekine larvae lacking nasus; tracheae and spiracles present. Cheliceral teeth ventral only.

Redescription: Palpal tarsus 4B plus tarsala; palpal claw pentafurcate. Tricuspid cap on cheliceral blades with ventral row of teeth. Scutum lacking nasus; anterior margin sinuate, lateral margins concave, posterior margin broadly convex; sensillae flagelliform. Onychotriches present.

Albeckia albecki Vercammen-Grandjean and Watkins

Albeckia albecki Vercammen-Grandjean and Watkins, 1966:74 [Holotype, larva, ex *Antrozous pallidus pacificus*, Solano Co., Cali-

fornia; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: See generic diagnosis.

Redescription: (Based on paratype: Holotype data in parentheses from original description): **Idiosoma:** Ovoid. Length and width of paratype 665 and 427. Eyes 2/2 in plates; anterior 15, posterior 14 in diameter. Dorsal setae 43 to 60 μ m, anterior rows irregularly placed, arranged approximately: 2 humerals (65 μ m)-6-6-6-6-8-10-6-4-2. Setae densely branched, branches long and slender. Two sternals plus 30 slender pre-anals (including first postanals), plus 26 postanals shorter but similar to dorsals. Anus at fifth row of setae. Spiracles large; tracheae visible to posterior third of idiosoma. **Gnathosoma:** Cheliceral bases sparsely punctate. Blades 38-40 μ m long with tricuspid cap and row of teeth anteroventrally. Palpal formula B/B/BBB; femoral, genual, and dorsotibial densely branched, ventrotibial and laterotibial sparsely branched, branches long. Tibial claws pentafurcate. Tarsus 4B plus tarsala. Galealae sparsely branched. **Scutum:** Shaped as originally figured. Anterior margin sinuate, lateral margins concave, posterior margin broadly rounded. Scutal setae similar to dorsals, sensillae flagelliform; apical half sparsely branched, branches long, bases slightly anterior to PL's. Measurements of paratype (measurements of holotype and 9 paratypes in parentheses—from original description) AW-74 (69), PW-85 (80), SB-32 (29), ASB-30 (28), PSB-18 (18), AP-25 (23), AMB-10 (10), AM-49 (44), AL-48 (44), PL-64 (63), S- (66). **Legs:** All leg segments with few punctate. Genua formula 1+,1+,1; Tibial formula 2+,2,1; microtibialae and microgenuaebae stubby. Tarsala I (11 μ m), spiniform microtarsala laterad of tarsala; sub- and parasubterminalae absent. Tarsala II (18 μ m) plus laterodistal spiniform microtarsala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,15. Distance between coxa I setae 34. Leg index 822.

Distribution: Venezuela and California.

Specimens Examined: Holotype and one paratype, ex *Antrozous pallidus pacificus*, Solano Co., California, Jan 1965; 1 larva, ex *Eptesicus montosus*, Venezuela, Distrito Federal, 4 km NNW Caracas (Los Venados), 1,559 m, 25 Jul 1965; and 7, ex *Histiotes* sp. A, Venezuela, Distrito Federal, 5 km NNE Caracas (Pico Avila), 2,101 m, 23 Aug 1965.

Other Records: 38 paratypes, *Antrozous pallidus pacificus*, Solano Co., California, Jan

1965 (Vercammen-Grandjean and Watkins, 1966:77).

Remarks: One paratype examined showed a small angulate projection on the scutum which appears to be a rudimentary nasus. According to Vercammen-Grandjean and Watkins (1966:76), this occurred on "several specimens in the type series of forty." The scuta of the Venezuela specimens did not possess this projection and were rounded laterally instead of possessing "broadly recessed" lateral margins. In all other respects, the Venezuela specimens compared well with the type material examined.

Genus *Odontacarus* Ewing

Odontacarus Ewing, 1929a:22 [Type species: *Trombicula dentata* Ewing, 1925, original designation]; Brennan 1959: 1; Vercammen-Grandjean, 1968:120; Vercammen-Grandjean, et al. 1973:64.

Acomatacarus Ewing, 1942:490; [Type species: *Acomatacarus arizonensis* Ewing, 1942, original designation]; Ewing, 1946:436; Gould,

1956:21; Brennan, 1959:1; Vercammen-Grandjean 1968:122, Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Differs from other leeuwenhoekine genera by possessing nasus, spiracles, tracheae, and dorsal and ventral rows of teeth on cheliceral blades.

Redescription: Larvae worldwide, parasitic on mammals, reptiles, and birds. Cheliceral blade 30-100 μm long with a row each of dorsal and ventral teeth, or a row of ventral teeth only (subgenus *Tarsalacarus*). Palpotibial claw with

3 to 4 prongs. Palpal formula B/B/B $\frac{NN}{BB}$. Pal-

pal tarsus 7B plus tarsala. Tracheae and spiracles present. Scutum subpentagonal with broadly rounded to bluntly angulate posterior margin. Sensillae flagelliform. Coxa I bisetose, coxa II variable, coxa III unisetose. Mastitarsala III usually present. Genu I, II, and III with 4 branched setae. Femora I, II, and III with 6, 5, and 4 branched setae, respectively.

Key to Subgenera and Species

- | | | |
|-------|--|--------------------------------|
| 1. | Tarsala III present, cheliceral blades with row of ventral teeth only (subgenus <i>Tarsalacarus</i>) | 16 |
| | Tarsala III lacking, cheliceral blades with dorsal row and ventral row of teeth (subgenus <i>Odontacarus</i>) | 2 |
| 2(1). | Distance between anterosubmedian scutal setae bases less than or equal to 11 μm ; tarsus I shorter than 75 μm | 3 |
| | Distance between anterosubmedian scutal setae bases greater than 11 μm ; tarsus I longer than or equal to 75 μm | 6 |
| 3(2). | One genuala I; dorsal setae broad, with dorsal and ventral barbs obviously differentiated | <i>sunni</i> <i>nae</i> n. sp. |
| | Two genualae I; dorsal setae not broader than thick | 4 |
| 4(3). | Sensillae with long branches apically | 5 |
| | Sensillae with short barbs, full length | <i>tubercularis</i> |
| 5(4). | Host, lizards; onychotriches present; legs slender; dorsal setae slender with oppressed barbs | <i>australis</i> |
| | Host, rodents and lagomorphs; onychotriches lacking; legs not slender; dorsal setae with stout, obvious barbs | <i>mastigophorus</i> |
| 6(2). | Cheliceral blades longer than 65 μm | 7 |
| | Cheliceral blades shorter than 65 μm | 9 |
| 7(6). | About 80 dorsal setae, stout with stout branches; posteromedian dorsal setae short, sparsely barbed; posterolateral scutal setae > anterolateral scutal setae > anterosubmedian scutal setae | <i>munchiquensis</i> |
| | About 100 to 200 dorsal setae; relatively slender, posteromedian dorsal setae similar to lateral setae | 8 |
| 8(7). | Nine branched setae on tibia I, 33 branched setae on tarsus I; sensillar bases considerably posterior to bases of posterolateral scutal setae | <i>schoenesetosus</i> n. sp. |

- Eight branched setae on tibia I, 23 branched setae on tarsus I; sensillar bases slightly posterior to bases of posterolateral scutal setae *dienteslargus* n. sp.
- 9(6). Genuala II and III present *kofordi*
 Genuala II and III lacking 10
- 10(9). Accessory branch on anterosubmedian scutal setae shorter than 20 μm ; distance between anterosubmedian scutal setae less than 16 μm 11
 Accessory branch on anterosubmedian scutal setae longer than 20 μm ; distance between anterosubmedian scutal setae more than 16 μm 14
- 11(10). Branched tibial setae for legs I, II, and III 9, 7, 7 12
 Branched tibial setae for legs I, II, and III 8, 6, 6, or 9, 6, 6 13
- 12(11). Coxa II bisetose; about 60 slender ventral setae (pre-anals) *tiptoni* n. sp.
 Coxa II unisetose; about 36 slender ventral setae (pre-anals) *vergrandi* n. sp.
- 13(11). Tibia I with 8 branched setae *comosus comosus* n. ssp.
 Tibia I with 9 branched setae *comosus novemsetus* n. ssp.
- 14(10). About 130 ventral setae; anterosubmedian scutal setae much shorter than anterolateral scutal setae 15
 About 70 ventral setae; anterosubmedian and anterolateral scutal setae subequal *vanderhammeni* n. sp.
- 15(14). Nasus nearly as broad as long; dorsal setae with short appressed setules .. *pugnus* n. sp.
 Nasus considerably longer than broad; dorsal setae with long, flexible setules *tuberculohirsutus* n. sp.
- 16(1). Palpal and dorsal setae heavily branched *bakeri*
 Palpal and dorsal setae sparsely branched *chiapanensis*

Subgenus *Odontacarus* (Ewing)

Odontacarus Ewing, 1929b:22 [Type species: *Trombicula dentata* Ewing]. Brennan, 1959:1; Vercammen-Grandjean 1968:120.

Diagnosis: Larvae with dorsal and ventral rows of teeth on cheliceral blades; genuala III lacking; palpotibial claw trifurcate.

Redescription: Larvae of medium to large size. Cheliceral blades 30-100 μm long with dorsal and ventral rows of teeth. Palpotibial claws trifurcate. Palpal formula variable, B/B/

$\frac{B}{BB}$ Flagellum usually with small barbs. Tarsala III lacking. Mastitarsala present, usually barbed. Dorsal setae usually with 4 rows of branches.

Odontacarus (O.) australis (Ewing)
 (Fig. 3)

Trombicula australis Ewing, 1929b:10 [Holotype, larva; ex *Tropidurus peruvianus*, Lima, Peru: Rocky Mountain Laboratory, Hamilton, Montana];

Odontacarus australis Ewing, 1931:6; Brennan, 1959:2; Brennan and Jones, 1961a:176.

Diagnosis: Differs from other members of the genus by the asymmetrically branched sensillae, length and form of idiosomal setae, length and slenderness of the legs, and onychotriches.

Redescription (Based on holotype. Data from Venezuela specimen parenthetically included): *Idiosoma:* Ovoid. Length and width of holotype, 538 and 314. Eyes 2/2 in plates; anterior 13, posterior 12 μm in diameter. Dorsal setae 34-44 μm (26-38 μm) tapering basally, setules delicate; arranged approximately: 2 (humeral, 59 μm)-8-5-7-8-10 plus 12 posterior setae and 5 lateral setae per side, not continuous with dorsal rows. Lateral setae longest, mid-dorsals shortest. Two sternals plus 50 ventrals, 32-39 μm , longer posterolaterally; pre-anals and first postanal row with longer setules. Posterior ventrals similar to dorsals. Anus at fourth row of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae broad, visible to posterior margin of idiosoma. *Gnathosoma:* Cheliceral bases moderately punctate, posterior punctae larger. Blades narrow, 47 μm long, curved apically with 5 dorsal and 3 or more ven-

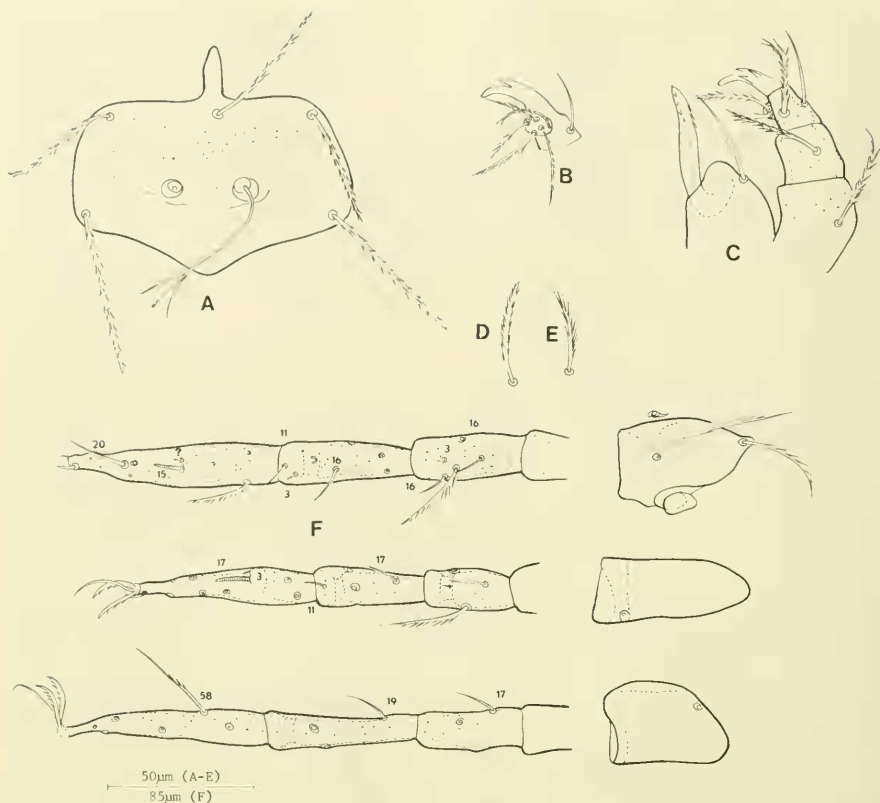


Fig. 3. *Odontacarus australis* A, scutum of holotype; B, palpal tibia and tarsus; C, palpus and cheliceral blade, dorsal aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

tral teeth. Palpal formula B/B/B?, femoral, genual, and dorsotibial setae moderately branched. Palpotibial claw of holotype obscured (claw of Venezuela specimens quadrifurcate with one large prong). Palpotarsal setae sparsely branched. Galeala with few barbs. *Scutum*: Shaped as figured. Moderately, faintly punctate medially. Anterior margin slightly sinuate; posterior margin angulate. Scutal setae moderately branched, similar to dorsals. Sensillae flagelliform with long branches, bases anterior to PL's. Measurements of holotype: AW-73 (76), PW-90 (87), SB-24 (24), ASB-34 (30-33), PSB-31 (25-27), AP-37 (30), AMB-? (10), AM-52 (42), AL-42 (35), PL-59 (54), S-50+ (60). Nasus 8 x 19 (8 x 19). *Legs*: Coxae moderately to densely punctate; leg segments sparsely punctate, punc-

tae large. Distance between coxae I setae 49 μm . Legs long and slender; tarsal claws with onychotriches, empodia possibly with few. Specialized setae as figured. Branched setae per leg segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus ?,17,15. Mastitarsala III barbed. Leg index 1130.

Distribution: Peru, Lima, and Venezuela, Zulia district.

Specimens Examined: Holotype, ex *Tropidurus peruvianus*, Lima, Peru, Apr 1928, and 12 larvae, ex 5 unidentified lizards, Venezuela Zulia, 34 km NNE Paraguaipoa (Cojoro), 15 m, 19 Jun 1968.

Other Material: None.

Remarks: Although Brennan (1959), described the palpal claw as trifurcate, Venezuelan specimens clearly show 1 large and 3 smaller prongs.

Odontacarus (O.) kofordi Brennan and Jones

Odontacarus kofordi Brennan and Jones, 1961a: 175 [Holotype, larva; ex *Chinchillula sahamae*, Puno, Peru; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Differs from *O. tubercularis* and other species with tuberculate setal bases primarily by the form and number of idiosomal setae and the subequal anterior and posterior eyes.

Redescription: Idiosoma: Ovoid. Length and width of holotype: 576 and 316. Eyes 2/2, in plates, subequal, about 15 μ m in diameter. Dorsal and ventral setal bases tuberculate; setae 32-58 μ m, longer anterolaterally. Setae thick with stout setules, as figured. Total dorsal setae about 90, in uneven rows; humerals 62 μ m long. Two sternals and 38 slender pre-anals and post-anals, plus about 20 posteriorly similar to dorsals. Anus at third row of ventrals. Spiracles large, adjacent to anterodistal margin of Coxa I. Tracheae visible to posterior margin of idiosoma. *Gnathosoma:* Cheliceral bases densely punctate. Blades 44 μ m long, with 5-6 small teeth dorsally and 5-6 irregularly spaced ventrally. Palpal formula B/B/BBB; femoral, genual, and dorso-tibial setae densely branched, latero- and ventro-tibial with about 6 branches. Palpal tarsala 12 μ m; branched tarsal setae long with long setules. Palpotibial claw trifurcate, axial prong largest. Galeala with few barbs. *Scutum:* Shaped as originally figured, anterior margin nearly straight, posterior margin bluntly angulate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length; bases slightly anterior to PL's. Measurements of holotype: AS-80, PW-113, SB-28, ASB-38, PSB-29, AP-33, AMB-13, AM-55, AL-56, PL-60, S-85. Nasus 12 x 26. *Legs:* Coxa I moderately punctate, coxa II densely punctate, coxa III moderately to densely punctate, other leg segments sparsely punctate. Distance between coxa I setae 47. Parasubterminala I lacking. Femur I and II, genu III and tibia III with 1 or 2 long, plumose setae. Specialized setae as originally figured. Genuala formula 2+,1,1; tibiala formula 2+,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,17,15. Leg index 970.

Distribution: Puno, Peru.

Specimens Examined: Holotype and 1 para-

type, ex *Chinchillula sahamae*, Puno, Peru, May 1951.

Other Material: 14 paratypes ex *Chinchillula sahamae*, *Abrocoma cinerea*, *Punomys lemminus*, and *Neotomys ebriosus*, Puno, Peru, May 1951 (Brennan and Jones, 1961a:175).

Odontacarus (O.) mastigophorus
Brennan and Dalmat

Odontacarus mastigophorus Brennan and Dalmat, 1960:184 [Holotype, larva; unidentified bird, Acatenango, Guatemala; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Separates from other *Odontacarus* spp. by possessing a mastitibiala III and by the differentiated dorsal and ventral setules of the dorsal setae.

Redescription: Idiosoma: Ovoid. Length and width of holotype 189 and 163. Eyes 2/2 in plates, anterior 10, posterior 7 μ m in diameter. Setal bases normal. Dorsal setae with 2 rows of broad setules dorsally and 2 rows of widely spaced thornlike setules ventrally; 25 to 33 μ m long, longer posterolaterally; humerals 38; arranged approximately 2 (humerals)-8-6-6-10-10-8 +6 posterior setae and 4 anterolateral setae not continuous with dorsal rows. Two sternals, 22 slender pre-anals, (26-29 μ m) and 6 postanals similar to dorsals. Anus at third row of ventral setae. Spiracles prominent, adjacent to anterodistal margin of coxa I. Trachea visible to coxa III region (variable among specimens examined). *Gnathosoma:* Cheliceral bases moderately punctate. Blades 36 μ m long with 5 dorsal teeth and a few small ventral teeth. Palpal formula B/B/BBB, all setae sparsely branched. Palpal tarsalae 6 μ m; tarsi with at least 5 long, sparsely branched setae. Tibial claws trifurcate, axial prong longest. Galealae with several barbs. *Scutum:* Shaped as originally figured, with slightly sinuate anterior margin and broadly rounded posterior margin; lightly punctate medially. Scutal setae uniformly branched. Sensillae with long branches apically; bases even with or slightly posterior to PL's. Measurements of holotype: AW-58, PW-71, SB-21, ASB-26, PSB-22, AP-21 to 23, AMB-8, AM-25, AL-32, PL-36, S-51. Nasus 6 x 15. *Legs:* Coxae apparently apunctate, other leg segments sparsely punctate. Distance between coxa I setae 32. Specialized setae as originally figured. Parasubterminala I lacking. Genuala formula 1+,0+,0. Tibiala formula 2+,2,0. Microsetae on genu and tibia stubby. Mastitibialae and mastitarsalae III with 1 or 2 barbs. Branched setae per leg segment for legs I, II, and III:

Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,5; tarsus 20,16,13. Claws with pair of onychotriches per claw, empodium nude.

Distribution: Guatemala: Finca Armenia, Aldea Los Plantes and Acatenango, Dept. Chimaltenango.

Specimens Examined: Holotype and 1 paratype, ex bird, Dept. Chimaltenango, Mar 1951; 4 paratypes ex *Sylvilagus floridanus chiapensis*, Chimaltenango, Feb 1951.

Other Material: Two paratypes and 23 specimens, ex *Sylvilagus floridanus chiapensis*, and 1 ex unidentified wood rat, Dept. Chimaltenango, Guatemala.

Remarks: The original description lists 5 branched setae on the palpotarsus. The genus typically has 7. Since none of the 6 specimens observed showed the tarsus clearly, assignment of the species to the genus is not questioned. The difference in the dorsal and ventral setules of the dorsal setae is obvious and diagnostic.

Odontacarus (O.) munchiquensis Brennan

Odontacarus (O.) munchiquensis Brennan, 1968: 679 [Holotype, larva; ex *Oryzomys albigularis*, Dept. Cauca, Colombia; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Differs from *O. tuberculohirsutus* n. sp. and other hirsute, tuberculate *Odontacarus* species primarily by the stout, sparsely branched posteromedian body setae.

Redescription: *Idiosoma:* Broad ovoid. Length and width of holotype: 490 and 407 (idiosoma split—hence measurements inaccurate). Eyes 2/2 in plates; anterior 14, posterior 11 μm in diameter. Setal bases tuberculate. About 90 dorsal setae in uneven rows, 49-102 μm , longer laterally; becoming stouter and with thicker branches posteromedially. Venter with 2 sternals, 44 slender pre-anals, 38-58 μm , plus 28 stout posterior setae similar to dorsals. Spiracle prominent, adjacent to anterior margin of Coxa I. Tracheae traceable to area of Coxa III. *Gnathosoma:* Cheliceral bases densely punctate. Blades 70 μm long with 8 teeth in dorsal row and about 19 in ventral row. Palpal formula B/B/BBB, latero- and ventrotibial setae with few branches, others moderately branched. Palpotarsal setae long, sparsely to moderately branched; tarsalae 13-15 μm long. Tibial claws trifurcate, axial prong largest. Galeala with 1 or 2 barbs (broken on holotype). *Scutum:* Moderately punctate, punctae large. Shaped as originally figured; anterior margin mildly sinu-

ate, posterior margin bluntly angulate. Scutal setae similar to dorsals. AM's apparently lacking accessory branch. Sensillae delicately barbed entire length; bases posterior to PL's. Measurements of holotype: AW-93, PW-116, SB-38, ASB-40, PSB-25, AP-30, AMB-15, AM-64, AL-76, PL-99, S-108. Nasus 12 x 19 (basally). *Legs:* All leg segments moderately punctate. Distance between coxa I setae, 41. Parasubterminala I absent. Specialized setae as originally figured. Genuala formula 2+,0+,0; tibiala formula 2+,2,1. Microsetae spineform. Branched setae densely branched or plumose. Mastitarsala III barbed, broken on holotype. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 27,17,14. Leg index 980.

Distribution: Colombia, Dept. Cauca.

Material Examined: Holotype, ex, *Oryzomys albigularis*, Pena del Perro, Dept. Cauca, Colombia, May 1967.

Other Material: 10 paratypes, ex 4 *Thomomys cinereiventer*, same area as holotype.

Remarks: The stubs of mastisetae on tarsi III are evident on the holotype, and one is long enough to show a few indistinct barbs. The original description listed mastitarsala III as absent. The galeala, although appearing nude, shows nubbins which indicate broken setules.

Odontacarus (O.) tubercularis (Brennan)

Acomatacarus tubercularis Brennan, 1952:145 [Holotype, larva; ex *Heteromys anomalus anomalus*, Aragua, Venezuela; Rocky Mountain Laboratory, Hamilton, Montana].

Odontacarus tubercularis: Brennan and Jones, 1960:496; Brennan, 1967: 153; Brennan, 1970: 34; Brennan and Lukoschus, 1971:44.

Odontacarus fieldi Brennan and Jones, 1961: 105, New SYNONYMY: [Holotype, larva; ex *Zygodontomys cherriei*, [= *Z. brevicauda*] Fort Kobbe, Canal Zone; Rocky Mountain Laboratory, Hamilton, Montana]. Brennan and Yunker, 1966:224.

Odontacarus cayolargoensis Brennan, 1959:2, New SYNONYMY: [Holotype, larva, ex *Sigmodon hispidus*, Key Largo, Florida; Rocky Mountain Laboratory, Hamilton, Montana]. Brennan and Jones, 1961b:105; Loomis and Crossley, 1963:381; Loomis, 1969:5.

Diagnosis: *Odontacarus tubercularis* differs from all other neotropical species of the nominate subgenus by the following combinations of characters. Distance between coxa I setae less than

40, AMB \leq 10, 2 genualae I, setillae with short barbs along entire length.

Redescription: *Idiosoma*: Ellipsoidal. Length and width of holotype (unengorged): 192 and 162. Eyes 2/2 in plates; anterior 12, posterior 10 μ m in diameter (paratype). All setae with tuberculate bases. Dorsal setae 40-77 μ m, longer laterally and posteriorly; with 4 rows of barbs, (fewer barbs ventrally on inner curve of seta). Venter with 2 sternals, approximately 24 slender pre-anals 24-28 μ m long, plus about 12 post-anals similar to dorsals. Spiracles at anterior margin of coxae I. Tracheae not visible in holotype, but visible in some specimens to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate. Blades 43-47 μ m long, with 6-8 dorsal and about 7 ventral teeth, widely spaced. Palpal formula B/B/BNN; branched setae sparsely barbed, ventrotibial and laterotibial occasionally barbed. Tarsalae 11 μ m. Branched tarsal setae sparsely branched. Tibial claws trifurcate, axial prong largest. Galealae with few barbs. *Scutum*: Shaped as originally figured, posterior margin broadly rounded. Punctae moderate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length, bases slightly posterior to PL's. Measurements of holotype: AW-62, PW-81, SB-29, ASB-30, PSB-23, AP-24, AMB-11, AM-51, AL-50, PL-72, S-90. Nasus 10 x 19. *Legs*: Coxae sparsely, finely punctate. Leg segments sparsely punctate. Specialized setae variable, similar to those figured for *O. cayolargoensis*, (Brennan, 1959:3, Fig. 1); genuala formula 2+,1,1; 2+,1+,0; or 2+,0+,0; tibial formula 2+,2,1. Branched setae plumose, less densely branched on distal leg segments. Distance between coxa I setae 36-37 μ m. Parasubterminala I lacking. Branched setae per segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus ?,17,14 (23,17,14 on other Venezuela specimens). Leg index (paratype) 710.

Distribution: United States (Florida and Texas), Panamá, Surinam, Trinidad, and Venezuela.

Material Examined: Holotype and 3 paratypes, ex *Heteromys anomalus anomalus*, Aragua, Venezuela, summer 1950; plus more than 1,200 larvae from Venezuela with the following frequency of infected hosts: 3 ex 4 *Monodelphis brevicaudata*; 1, ex 1 *Marmosa* sp. A; 81, ex 13 *M. fuscata*; 52, ex 13 *M. robinsoni*; 42, ex 10 *Didelphis marsupialis*; 1, ex *Saccoperyx bilineata*; 1, ex *Micronycteris microtis*; 5, ex *Carollia brevicauda*; 3, ex 1 *Vampyropsis helleri*; 8, ex 1 *Vampyressa pusilla*; 1 ex *Syloilagus floridanus*;

6, ex 1 *Sciurus granatensis*; 285, ex 40 *Heteromys anomalus*; 207, ex 40 *Oryzomys albigularis*; 3, ex 3 *O. concolor*; 1 ex *O. fulvescens*; 2, ex 2 *O. minutus*; 3, ex 1 *Nectomys alfari*; 1, ex *Thomasomys lugens*; 14, ex 3 *Akodon urichi*; 36, ex 8 *Zygodontomys brevicauda*; 114, ex 28 *Sigmodon hispidus*; 46, ex 9 *Sigmomys alstoni*; 1, ex *Rattus norvegicus*; 9, ex 1 *R. rattus*; 29, ex 3 *Agouti paca*; 2, ex 2 *Dasyprocta aguti*; 77, ex 22 *Proechimys semispinosus*; 3, ex 1 *Mazama americana*.

Above collections were made during 1965-1968, in every month except September, from nearly every Venezuelan state. Other material examined includes 89 specimens from the following locations and hosts. UNITED STATES OF AMERICA: 6, ex *Liomys irroratus*, Brownsville, and Cameron Co., Texas, Oct 1960, and Nov 1962; 8, ex *Sigmodon hispidus*, Monroe Co., Florida, Jan 1945. PANAMÁ: 2 larvae, ex *Didelphis marsupialis*; 4, ex 2 *Liomys adpersus*; 1, ex *Zygodontomys brevicauda*; 21, ex 17 *Sigmodon hispidus*; 1, ex *Proechimys semispinosus*; 1, ex *Felis pardalis*; 3, ex *Neomorphus Geoffroyi salvini*; 2, ex *Odontophorus erythrops*; collected from Canal Zone, Bocas del Isla, Darién, and Cerro Campana, Dec 1960; Feb, Mar, Sep, and Oct 1961 and Feb 1962. SURINAM: 5 larvae, ex *Proechimys guyannensis*, Uitkyk; 4 ex *Dasyprocta* sp., "Surinam" 1961 and Jan 1970. TRINIDAD: 6 larvae, ex *Rattus* sp.; 1, ex *Proechimys guyannensis*, 1, ex *D. aguti*; Cumaca and Aripa Cave, May 1954, Apr 1960, and May 1965.

Other Records: *Neomorphus Geoffroyi salvini*, *Odontophorus erythrops*, *Didelphis marsupialis*, *Proechimys semispinosus*, *Liomys adpersus*, *Sciurus granatensis*, *Sigmodon hispidus*, *Zygodontomys microtinus*, and *Felis pardalis* from Canal Zone, Darién, Panamá, (Brennan and Yunker 1966:224); *Zygodontomys cherriei*, and *Sigmodon hispidus*, Canal Zone (Brennan and Jones 1961:105); *Proechimys guyannensis* and *Nectomys squamipes*, Cumaca, Trinidad (Brennan and Jones, 1960:496); *Philander opossum*, *Nectomys squamipes melanius*, and *Proechimys guyannensis*, Coronic, Surinam (Brennan and Lukoschus 1971:44); *Sigmodon hispidus*, Key Largo, Florida (Brennan, 1959); *Liomys irroratus*, *Peromyscus leucopus*, and *Sigmodon hispidus*, Cameron Co., Texas (Loomis and Crossley, 1963); *Heteromys gaureri*, *Ototylomys phyllotis*, *Peromyscus yucatanicus*, and *Sigmodon hispidus*, Campeche and Yucatán, México (Loomis, 1969).

Remarks: *Odontacarus fieldi* and *O. cayolargoensis* were originally separated on the basis of the genuala configuration of legs I and II. Examination of 56 specimens from Panamá, topotypes for *O. fieldi*, showed only 16 (29 percent)

with a typical *O. fieldi* configuration of 2-0-0 genualae on legs I, II, and III, respectively. Twenty-three specimens (41 percent) lacked a genuala II on 1 leg and 7 specimens possessed genualae II on both legs. In addition, 8 specimens had both genualae II and III, and 2 possessed both genualae III but lacked 1 of the genualae II. Comparison of the holotypes of *O. fieldi* and *O. cayolargoensis* with the comparison microscope showed setae and scutal characteristics to be identical, with slight differences in the thickness of the dorsal setae.

The synonymy of *O. tubercularis* to *O. cayolargoensis* and *O. fieldi* was suspected when approximately 160 specimens from Venezuela could not be assigned with certainty to any one of the 3 species. Two hundred eighty-five specimens were found to possess both genualae II and III, and over 900 specimens lacked genuala III, including 3 specimens which lacked genuala III on one side only. Three specimens lacked both genualae II and III.

Other characteristics differed considerably. The length of setae, as indicated by the length of the posterolateral scutal setae, varied from 55 to 68 μm for those with genualae III, and from 60 to 88 μm for those lacking genuala III. Numbers of idiosomal setae differed slightly as indicated by a variation of 22 to 34 pre-anal setae. Stoutness of idiosomal setae was as variable as their length. No correlation was determined from distributional, host, or seasonal data.

Odontacarus (O.) comosus comosus n. ssp.
(Fig. 4)

Type Data: Holotype and 3 paratypes, RML #53639 ex *Thomasomys hylophilus*, Venezuela, Táchira, 41 km SSW San Cristóbal (Buena Vista), 2,350 m, 23 Mar 1968; other paratypes. One larva each, RML #'s 52993, 55977, 55983, and 56007; 2 each, RML #'s 52962, 53629, 53642, and 56006; 3 each, RML #'s 52963, 52964, 53659, 53664, and 55930 ex *T. hylophilus*, Venezuela, Táchira, 41 km SW San Cristóbal, (Buena Vista), 2,350 to 2,420 m, 5-27 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from closely related *O. munchiquensis*, Brennan, by the undifferentiated posterior setae, shorter cheliceral blades, and scutal shape.

Description: *Idiosoma:* Broad ovoid. Length and width of holotype (unengorged) 283 and

228. Eyes 2/2 in plates. Anterior 15, posterior 14 μm in diameter. Dorsal and ventral setal bases tuberculate. Dorsal setae 45-101 μm , with 4 rows of setules; arranged approximately: 2 humerals (93 μm)-13-10-9-8-8 + 14 posterior and 8 long lateral setae not continuous with dorsal rows. Dorsal setae 45-101 μm , longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long branched pre-anals and para-anals in uneven rows, 1 pair of slender post-anals, plus 10 posterior setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles very large, adjacent to anterior margin of coxa I. Tracheae visible to posterior margin of idiosoma. *Gnathosoma:* Cheliceral bases moderately punctate. Blades 43-54 μm long, with 5 to 6 dorsal teeth and about 8 ventral teeth. Palpal formula B/B/B/BB; genual and femoral setae moderately barbed, dorsotibial densely barbed. Laterotibial setae usually with 1 barb, ventrotibial with 3 to 6. Palpal tarsalae 13 μm ; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galealae sparsely barbed. *Scutum:* Moderately punctate. Shaped as figured, with posterior margin broadly rounded to bluntly angulate. AM's with accessory branch, AL's apparently with 2 rows of setules, other setae similar to dorsals. Sensillae sparsely barbed, bases slightly posterior to PL's. Measurements of holotype: AW-80, PW-111, SB-34, ASB-41, PSB-23, AP-32, AMB-13, AM-60, AMA-12, AL-73, PL-85, S-101+. Nasus 12 x 23. *Legs:* Coxae II and III, densely punctate, coxa I moderately punctate, leg segments moderately punctate. Distance between coxa I setae 47. Parasubterminala I lacking, mastitarsala on leg III barbed. Specialized setae as figured. Branched setae plumose; Femur I and II with moderately long plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsala 29-30,18,15. Leg index 900.

Distribution: Venezuela, Táchira state.

Specimens Examined: Types plus: One larva ex *Marmosa dryas*, 1, ex *M. impavida*, 1, ex *Oryzomys albigularis*, 2, ex *O. minutus*, 2, ex *Rhhipidomys venustus*, and 2, ex unidentified bird, Venezuela, Táchira, 52 km SSW San Cristóbal (Buena Vista), 2,370-2,420 m, 23-29 Mar 1968.

Remarks: Variation was noted in the number of dorsal setae, which varied from 60-70; length of scutal setae; and the number of barbs on the ventrotibial and laterotibial palpal setae. The name was derived from the Latin *comosus*, long hair, referring to the long dorsal setae.

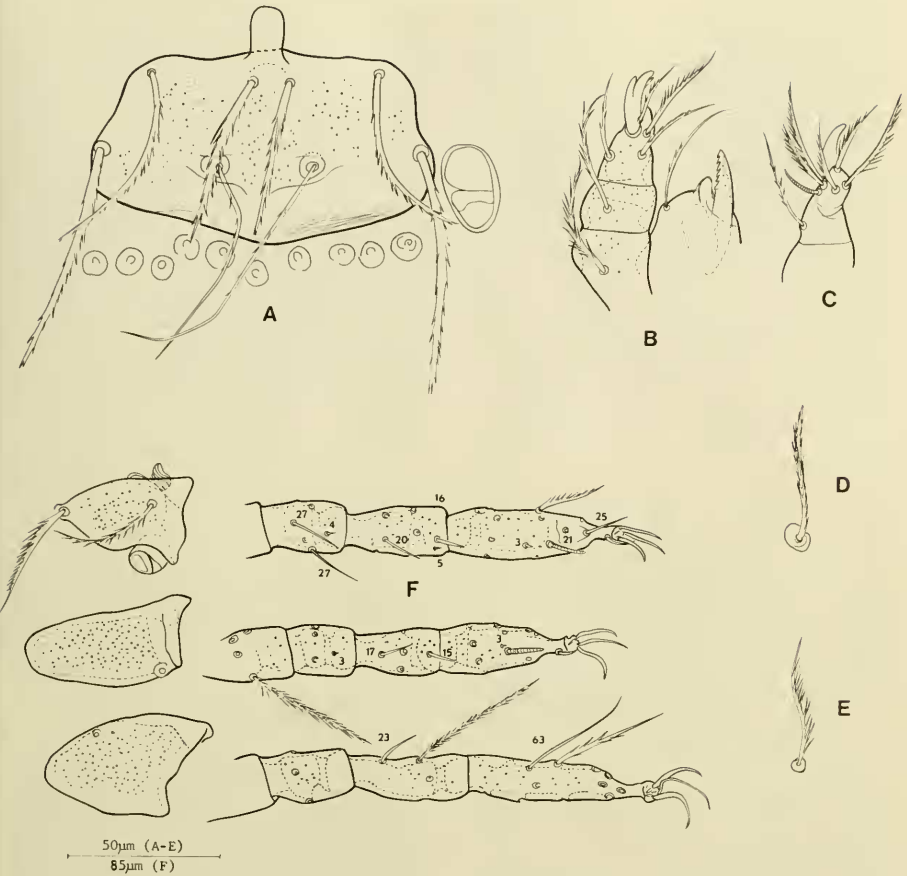


Fig. 4. *Odontacarus comosus comosus*, new subspecies. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

Odontacarus (O.) comosus novemsetus n. ssp.
(Fig. 5)

Type Data: Holotype and 3 paratypes, RML #48752, ex *Oryzomys albigularis*, Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,172 m, 28 Aug 1965. Other paratypes: 1 larva, RML #48889, ex *Marmosa fuscata* Venezuela, Distrito Federal, 31 km WSW Caracas, 1,780 m, 21 Dec 1965; 1, RML#48746, ex *Heteromys anomalus* and 1 each, RML#48715 and 48748; 2 each, RML#48729 and 48762, and 3, RML#48753, ex *O. albigularis*, Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,124-2,172 m, 25

Aug-Nov 1965; 2, RML#48888, ex *O. albigularis*, Venezuela, Miranda, 31 km WSW Caracas (Alto Ño Leon), 1,950 m, 20 Dec 1965. N. E. Peterson, collector.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from the nominate subspecies primarily by having 9 branched setae on tibia I and 6 on tibia II and III.

Description: *Idiosoma:* Broad ovoid. Length and width of holotype (unengorged) 288 and

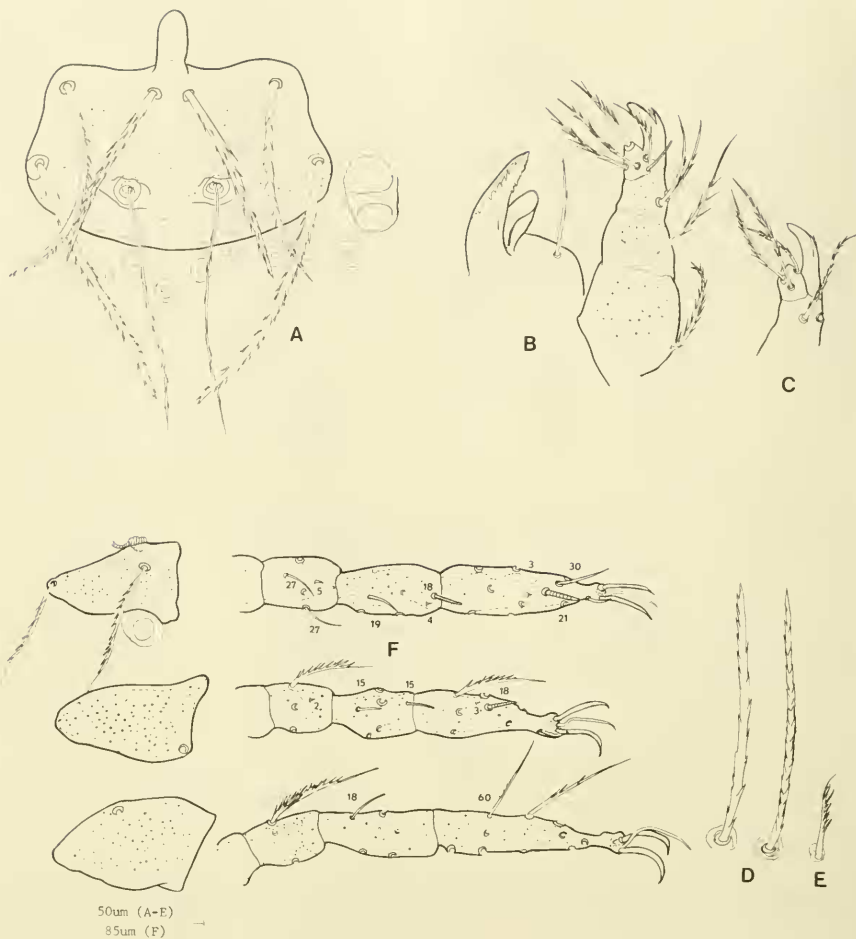


Fig. 5. *Odontacarus comosus novemsetus*, new subspecies. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tarsus and tibia, dorsal aspect; D, anterolateral dorsal seta—left, ventral aspect, right, dorsal aspect; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

230. Eyes 2/2 in plates, anterior 14, posterior 13 μm in diameter. Dorsal and ventral setal bases large tuberculate. Dorsal setae 55-91 μm , with 4 rows of setules: arranged approximately: 2 humerals (86 μm)-10-9-8-8-8+16 posterior and 10 long lateral setae not continuous with dorsal rows, longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long-branched pre-anals and para-anals in uneven rows; 1 pair of slender postanals and 6-10 pos-

terior setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles very large, adjacent to anterior margin of coxa I. Tracheae convoluted, visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases punctate. Blades 53 μm long, with 6 dorsal teeth and 9-10 ventral teeth. Palpal formula B B BBB; genual, femoral, and dorsotibial setae moderately branched, branches short; laterotibial setae nude or with 1-2 barbs. Ventrotibial with 3-4 barbs.

Palpal tarsalae 13 μm ; branched setae long, moderately branched, with long setules. Tibial claws trifurcate; axial prong largest. Galealae with few barbs. *Scutum*: Moderately punctate. Shaped as figured. Accessory branch on AM short; other setae similar to dorsals. Sensillae sparsely barbed; bases slightly posterior to PL's. Measurements of holotype: AW-77, PW-101, SB-33, ASB-46, PSB-23, AP-31, AMB-12, AM-72, AMA-7, AL-75, PL-96, S-106. Nasus 12 x 25. *Legs*: Coxae densely punctate, leg segments moderately punctate. Distance between coxa I setae 48. Parasubterminala I lacking; mastitarsala III barbed. Branched setae plumose. Femur I and II, genu and tibia III with moderately long plumose setae as figured. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 27,16,15. Leg index 1070.

Distribution: Venezuela, Distrito Federal and Miranda.

Specimens Examined: Type specimens.

Remarks: Variations were less obvious in *O. c. novemsetus* than in the nominate subspecies. The variational overlap noticed in the diagnostic characters separating the 2 subspecies was the presence of 7 branched tibial setae on 1 leg of a single specimen. The name refers to the 9 branched tibia I setae.

Odontacarus (O.) dienteslargus n. sp.

(Fig. 6)

Type Data: Holotype, RML#53661, and 23 paratypes: 3 each-RML#53211 and 56006; 2 each-RML#s 52964, 53629, and 55988, 4-RML# 55984 and 1 each-RML#52962, 56001, 55939, 53685, 53639, 53637, and 53230, ex *Thomasomys hylophilus*, Venezuela, Táchira, 41 km SW San Cristóbal (Buena Vista), 2,355 to 2,423 m, 2-25 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from the closely related *O. munchiquensis* primarily in having $PL \geq AM > AL$, little variation in dorsal setae from anterior to posterior, and fewer ventral teeth on the cheliceral blades.

Description: *Idiosoma*: Broad ovoid to circular, length and width of holotype 257 and 228. Eyes 2/2; anterior 15, posterior 13 μm in diameter; plate present. About 130 dorsal setae, 36-86

μm long, midlaterals longest, arranged in uneven rows. Setae stout, with 4 rows of stout barbs, posterior setae stoutest. Two sternals plus about 90 ventrals, 35-70 μm in uneven rows; pre-anals slender with long setules, postanals like dorsals. Anus located approximately at fourth row of setae. Spiracles large, tracheae visible to coxa III. *Gnathosoma*: Cheliceral bases densely punctate; cheliceral blade length 74; 6-8 dorsal teeth; 12-13 ventral teeth, posterior teeth largest. Palpal formula B/B/BBB, femoral and genu setae moderately branched, with long branches; dorso-tibial densely branched with short branches; laterotibial with 1-2 barbs, ventrotibial with 3-4 branches. Palpotibial claws trifurcate, axial prong longest. Palpotarsus 7B; tarsala 18 μm . Galeala sparsely branched. *Scutum*: Subpentagonal; moderately punctate; anterior and lateral margins slightly sinuate; apex of posterior margin bluntly angulate. Scutal setae similar to dorsals, AL's less stout than AM's and PL's. AM's lacking accessory branches. Proximal 2/3 of sensillae barbed, sensillar bases slightly posterior to PL's. Measurements of holotype: AW-99, PW-118, SB-47, ASB-43, PSB-27, AP-26, AMB-15, AM-77, AL-65, PL-77, S-116. Nasus 12 x 20. *Legs*: Coxae and leg segments moderately punctate. Distance between coxa I setae 37. Specialized setae as figured. Leg III with barbed mastitarsala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,16. Leg index 931. Onychotriches absent.

Distribution: Venezuela: Mérida and Táchira.

Specimens Examined: Type specimens plus the following Venezuela material. Three larvae, ex *Cryptotis thomasi*, 2, ex *Oryzomys albigularis*, 1, ex *Chilomys instans* and 2, ex *Akodon bogotensis*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2395-2410 m, 13 to 18 Mar 1968; 4, ex *Thomasomys laniger*, Mérida, 3 km W Timotes (Paramito), 3230 m, 16 Feb 1966.

Remarks: No significant variations were noted. The name refers to the cheliceral blades.

Odontacarus (O.) pugnosus n. sp.

(Fig. 7)

Type Data: Holotype, RML#51863 and 2 paratypes, RML#s 51854 and 52769, ex *Thomasomys laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160-3785 m, 11-23 Mar 1966. Other paratypes: 2, RML#51866 and 1 each, RML#s 49054, 49053, 51867, 52814, and 49052, ex *Oryzomys minutus*, Venezuela, Mérida, 7-9 km SE

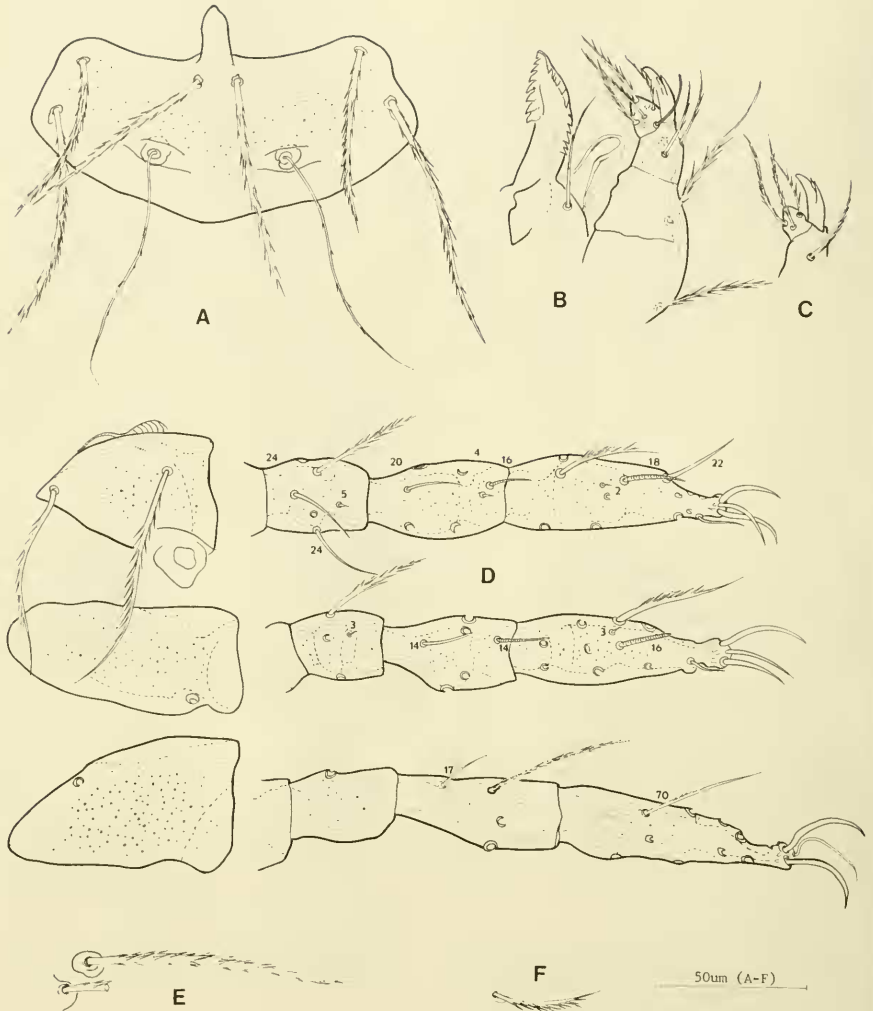


Fig. 6. *Odontacarus dicleslargus*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal claw and tarsus, dorsal aspect; D, coxae and leg segments showing specialized setae; E, anterolateral dorsal seta; F, antersubmedian ventral seta.

Tabay (La Coromoto), 3190-3370 m, 15-17 Mar 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: *O. pugnus* differs from *O. tuberculohirsutus* in having appressed, short branches on the dorsal setae and the broad, short scutal nasus.

Description: *Idiosoma:* Ovoid; length and width of holotype: 388 and 278. Eyes $2/2$ in

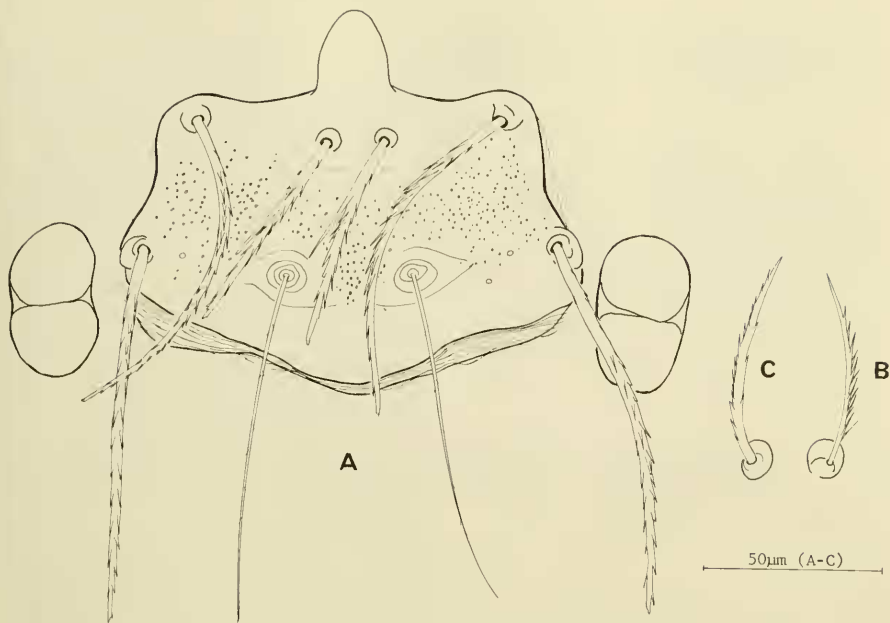


Fig. 7. *Odontacarus pugnosus*, new species. A, scutum; B, anterosubmedian ventral seta; C, anterosubmedian dorsal seta.

plates; anterior and posterior eyes subequal, 25 μm in diameter. About 180-200 stout, moderately branched dorsal setae, 96-101 μm long, anterolaterals longest. Humerals not distinguished from dorsal setae. Ventral setae slender, with long setules; 2 sternals plus about 130 ventrals in uneven rows, 57-81 μm long, becoming stouter posteriorly; posterior setae similar to dorsals. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. *Gnathosoma*: Similar to that of *O. tuberculohirsutus*. Cheliceral bases densely punctate; blades 62 μm long, with 5-6 dorsal and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorsotibial setae densely branched, laterotibial claws slender, trifurcate; para-axial prongs small. Palpotarsala 19 μm long; branched setae long, moderately branched. Galealae sparsely barbed. *Scutum*: moderately punctate; nearly quadrate, with broadly rounded to bluntly angulate posterior margin. Lateral scutal setae similar to dorsals; AM's with prominent, nude accessory branch. Sensillae long, with few minute barbs; bases slightly posterior to PL's. Measurements of holo-

type: AW-96, PW-117, SB-40, ASB-60, PSB-36, AP-43, AMB-18, AM-67, AMA-24, AL-106, PL-117, S-121. Nasus 20 x 25 μm . *Legs*: Coxae densely punctate; other segments moderately punctate. Distance between setae of coxae I: about 62. Specialized setae similar to those figured for *O. tuberculohirsutus*, but with mastitarsala III stouter and with numerous branches. Femur I and II, genu II and III, and tibia III with long, plumose setae. Branched setae per segment for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8, 7,7; tarsus 38,29,24. Leg index 1280.

Distribution: Venezuela: Mérida state.

Specimens Examined: Type material.

Remarks: The name refers to the short, broad nasus.

Odontacarus (O.) schoenesetosus n. sp.

(Fig. 8)

Type Data: Holotype and one paratype, RML#49029, ex *Thonasonomys vestitus*, Venezuela, Trujillo, 15 km E Trujillo (Hda. Misisí),

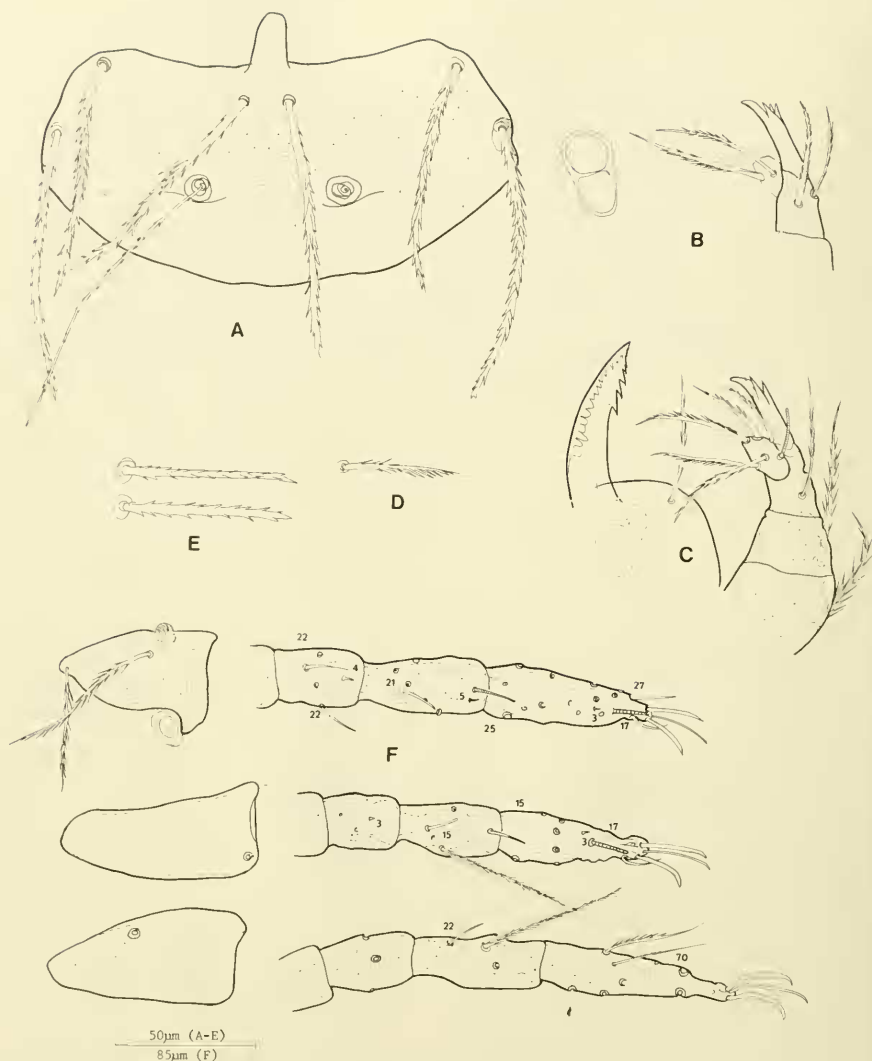


Fig. 8. *Odontacarus schoenesetosus*, new species. A, scutum; B, palpal tibia and tarsus, dorsal aspect; C, palpus and cheliceral blade, ventral aspect; D, anterosubmedeoan ventral seta; E, antersubmedian dorsal seta—top, dorsal aspect, bottom, ventral aspect; F, coxae and leg segments showing specialized setae.

2250 m, 29 Jan 1966. Other paratypes: 1, RML #49040 and 8, RML#52813, ex *T. laniger*, Venezuela, Mérida, 3 km W Timotes (Paramito), 3206-3230 m, 14 and 16 Feb 1966; 1 RML#48918 and 6, RML#48920, ex *T. lugens*, Venezuela,

Trujillo, 15 km E Trujillo (Hda Misisí), 2350 to 2360 m. 25 and 26 Jan 1966; 11, RML#52808, ex *Lonchorhina aurita*, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965; 1, ex *Artibeus jamaicensis*, Venezuela, Trujillo,

25 km NW Valera (Agua Santa), 90 m, 22 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Cheliceral blades longer than 80 μm ; scutum wide, with posterolateral setae far anterod of the sensillar bases, and with deeply sinuate anterior margin.

Description: *Idiosoma:* Broad ovoid to circular; length and width of holotype (unengorged): 288 and 283. Eyes 2/2 in a plate, anterior 18, posterior 17 μm in diameter. Approximately 150-200 dorsal setae in uneven rows, longer laterally and posteriorly, 38-86 μm long. Setal bases large, tuberculate. Setae stout, with 4 rows of short, stout barbs. Venter with two sternals plus about 100 ventral setae, 42 to 86 μm . Anterior ventrals slender with long branches; posterior ventrals similar to dorsals; bases tuberculate. Anus at about the fifth row of ventral setae. *Gnathosoma:* Cheliceral bases densely punctate; blades 80-100 μm ; teeth large, numbering 7 to 8 dorsally and about 18 ventrally. Palpal formula B/B/BBB, the femoral, genual, and dorsotibial setae moderately branched; laterotibial and ventrotibial with 1 to few barbs, laterotibial occasionally nude. Palpotarsalae 14 μm ; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galealae sparsely branched with short barbs. *Scutum:* Moderately punctate. Shaped as figured, anterior margin deeply sinuate, posterior margin broadly rounded. Setae similar to dorsals but more heavily branched. AM with short accessory branch. Sensillae sparsely barbed entire length, bases considerably posterior to PL's. Measurements of holotype: AW-115, PV-147, SB-52, ASB-50, PSB-34, AP-25, AMB-17, AM-92, AMA-13, AL-83, PL-84, S-132. Nasus 12 x 21. *Legs:* Coxae and leg segments moderately punctate. Distance between coxa I setae 48. Parasubterminala I lacking. Mastitarsala III barbed. Specialized setae as figured. Branched setae plumose; femur I and II, tibia III, and genu III with very long, plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 33,22,19. Tarsal claws nude. Leg index 1133.

Distribution: Venezuela: Trujillo and Mérida states.

Specimens Examined: Type specimens.

Remarks: Variation noted in the species in-

clude 10 rather than 9 branched setae on tibia I, malformed cheliceral blades on one specimen, and very long cheliceral blades on another. The average length of the cheliceral blades is 84 μm .

Odontacarus (O.) sunniana n. sp.
(Fig. 9)

Type Data: Holotype and 6 paratypes, RML #53580 and 14 paratypes as follows: 3 each RML #'s53581 and 53585, 2 each RML #'s53582 and 53583, 1 each RML #'s53584 and 53579, ex *Proechimys semispinosus*, Venezuela, Lara, 10 km N El Tocuyo (Casario Boro), 518 m, 15 July 1968; 2 RML #53270, ex *P. semispinosus*, Venezuela, Falcón, 84 km NW Carora (Cerro Socopo) 1265 m, 13 May 1968. F. Brown, J. Madsen, A. L. and M. D. Tuttle, and N. E. Peterson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Distinguished from other species of the genus by short, broad dorsal setae and a single genuala I.

Description: *Idiosoma:* Broad ovoid (engorged); length and width of holotype, 157 and 138. Eyes 2/2 in indistinct plate; anterior 11 μm posterior 9 μm in diameter. Dorsal setae 28-52 μm , longer laterally and posteriorly, with 2 rows of setules dorsally. Approximate dorsal formula: 2 humerals (52 μm)-8-8-8-10-8-6-2. Venter with 2 sternals plus about 42 ventral setae; pre-anals slender, with delicate barbs, becoming stouter laterally, 26-41 μm long. Post-anals similar to dorsals. Anus located between rows 2 and 3. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I; tracheae visible for short distance only. *Gnathosoma:* Cheliceral bases moderately punctate, punctae indistinct; cheliceral blades 38 μm long, teeth small, numbering 5-6 dorsally and 5-6 ventrally. Palpal formula B/B/BBB; dorsotibial and ventrotibial setae with 1 or 2 barbs. Palpotarsalae about 8 μm long. Palpotibial claw trifurcate, axial prong largest. Galealae sparsely branched. *Scutum:* Small, sparsely punctate, subpentagonal; posterior margin broadly rounded to bluntly angulate. Scutal setae densely branched; laterals broadly curved, with fewer setules on inner side. Sensillae heavily barbed, branches more numerous and longer apically; sensillar bases even with PL's. Measurements of holotype: AW-65, PV-82, SB-23, ASB-27, PSB-18, AP-23, AMB-10, AM-42+, AL-42, PL-51, S-62. Nasus 9 x 12. *Legs:* Coxae and leg

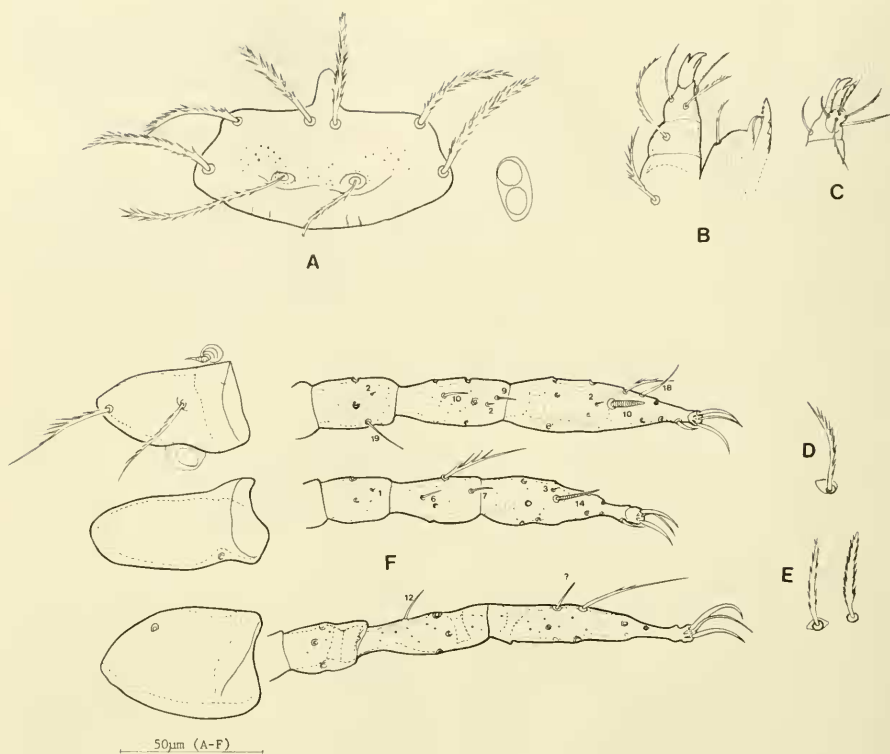


Fig. 9. *Odontacarus sunniana*, new species. A, scutum; B, palpal tarsus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian ventral setae; E, anterosubmedian dorsal seta—left, ventral aspect, right, dorsal aspect; F, coxae and leg segments showing specialized setae.

segments with a few scattered punctae. Distance between coxa I setae 27-28. Legs short; parasubterminala on leg I lacking; mastitarsala III present, nude, apparently fragile. Tarsal claws with a pair of minute onychotriches visible in some specimens. Specialized setae as figured. Branched setae per leg segment for legs I, II, and III; coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,16,14. Leg index 790. Onychotriches lacking.

Distribution: Venezuela: Barinas, Falcón, Lara and Miranda states.

Specimens Examined: Type specimens plus the following Venezuela material. One larva, ex *Didelphis marsupialis*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1150 m, 15 May 1967; 1, ex *Marmosa fuscata*, Aragua, 12 km N Maracay, 30 Mar 1960; 1, ex *Sciurus granatensis*

and 2, ex *Proechimys semispinosus*, Barinas, Altamira, 600 and 794 m, 2 and 4 Jan 1968. 2, ex *Oryzomys albicularis*, Miranda, 1 km N Caracas (Quebrada Chacaito), 1150-1175 m, 18 May 1967; 2, ex *Sigmodon hispidus*, Lara, 10 km N El Tocuyo (Caserio Boro), 518 and 537 m, 15 and 17 July 1968.

Remarks: In addition to the type series and other records listed above, 2 specimens, ex *Proechimys semispinosus*, Falcón, Urama, 19 km NW Urama, 25 m, 26 Oct 1966, are considered here as a form of *O. sunniana*. *O. sunniana* was named for the wife of the senior author.

Odontacarus (O.) tiptoni n. sp.
(Fig. 10)

Type Data: Holotype and 7 paratypes, RML #49029, and 9 paratypes RML#48925, ex *Thom-*

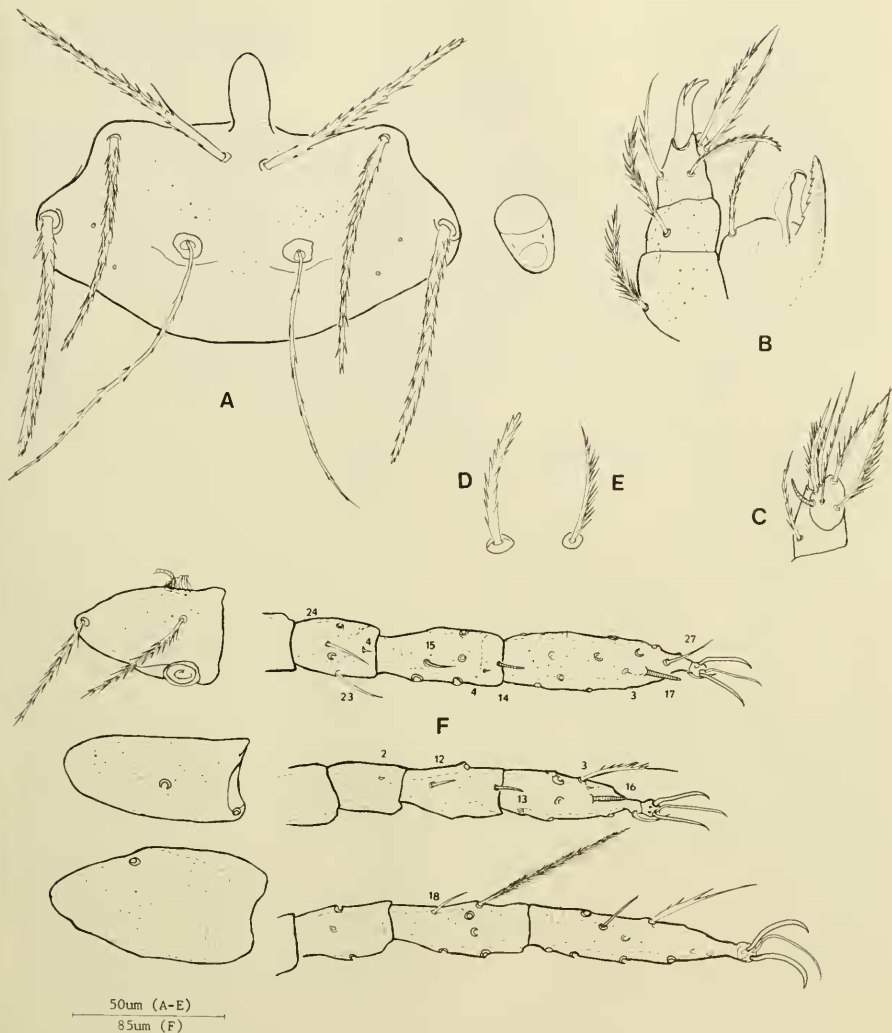


Fig. 10. *Odontacarus tiptoni*, new species. A, scutum; B, palpus and clerical blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

asomys vestitus; Other paratypes: 1 RML# 48909, ex *Marmosa dryas*; 1 RML#48898, ex *Oryzomys albicularis*; 1 RML#49032, *O. ex minutus*; and 1, RML#48918, ex *Thomasomys lugens*; Venezuela, Trujillo, 15 km E Trujillo, 2350-2360 m, 19 to 29 Jan 1966. N. E. Peterson,

collector. Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Distinguished from the closely related *O. schoenesetosus* n. sp. by the following

combination of characters: AM, AL, and PL subequal. Two coxa II setae, short accessory branch on AM, and the stout, idiosomal setae.

Description: Idiosoma: Broad ovoid; length and width of holotype, 230 and 192. Eyes 2/2, in indistinct plates; anterior 18, posterior 13 μm in diameter. About 110 dorsal setae in uneven rows, 44-90 μm , becoming longer laterally and posteriorly. Humerals not distinguishable. Setal bases tuberculate; setae stout with 4 rows of setules. Two sternals plus about 60 slender pre-anals and 20 posterior ventral setae in uneven rows. Pre-anals more slender with longer setules, 40-70 μm long; postanals and lateral ventral setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I. Tracheae obvious, traceable throughout the idiosoma. *Gnathosoma:* Cheliceral bases densely punctate, punctae large and obvious; cheliceral blade length 50 μm ; teeth small, about 7 dorsal, and about 10 ventral. Palpal formula B/B/BBB; the latero- and ventrotibial setae with 1 to several barbs; other setae densely branched. Palpotarsala about 11 μm long; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galeala moderately branched. *Scutum:* Moderately punctate, pentagonal, anterior margin slightly sinuate, posterior margin broadly rounded. Setae similar to dorsals. Sensillae lightly barbed along entire length, accessory branch present. Sensillar bases slightly posterior to PL's. Measurements of holotype: AW-93, PW-133, SB-47, ASB-43, PSB-33, AP-32, AMB-14, AM-83, AMA-12, AL-78, PL-84, S-95+ (AM, AL, and PL variable). Nasus 13 x 27. *Legs:* Coxae and leg segments moderately punctate. Distance between coxa I setae 50. Mastitarsala III barbed. Parasubterminala I lacking. Specialized setae as figured. Femur I and II, genu and tibia III with long, densely plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 34,21,19. Leg index 1147. Onychotriches lacking.

Distribution: Venezuela: Trujillo state.

Specimens Examined: Type specimens.

Remarks: Named for Dr. Vernon J. Tipton, Department of Zoology, Brigham Young University.

Odontacarus (O.) tuberculohirsutus n. sp.

(Fig. 11)

Type Data: Holotype and 8 paratypes, RML #49049, and 29 paratypes: 3, RML#49045, 7, RML#51851, 6, RML#51850, 5, RML#48116,

2, RML#49044, 1 each, RML#s 49046, 52774, 52771, 51861, 51849, 49042, ex *Thomasomys laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160 to 3785 m, 11-23 Mar 1966, N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: *O. tuberculohirsutus* differs from other *Odontacarus* species by the combination of large, tuberculate setal bases, number and form of body setae, and large accessory branches on anterosubmedian scutal setae.

Description: Idiosoma: Ovoid; length and width of holotype: 451 and 336. Eyes 2/2 in plates; anterior 20, posterior 17 μm in diameter. About 200 slender dorsal setae, 60-105 μm , densely barbed, basal branches 6-8 μm . Posterior setae stouter, with short appressed barbs; lateroposterior setae longest. Humerals not distinguished from dorsal setae. Ventral setae 45-85 μm ; 2 sternals, plus about 130 ventrals in uneven rows. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. *Gnathosoma:* Cheliceral bases densely punctate; blades 64 μm long, with 5-6 dorsal teeth and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorso-tibial setae densely branched, laterotibial with an occasional barb, ventrotibial 3-4 branched. Palpotibial claws trifurcate. Palpotarsala 17 μm ; branched tarsal setae long, moderately branched. Galealae sparsely barbed. *Scutum:* Moderately punctate, pentagonal; lateral margins sinuate, posterior margins sunken, with striations encroaching to raised portion of scutum. Scutal setae stout, AM's with prominent, nude accessory branch. AM's and AL's sparsely branched, with short appressed barbs. Posterior setae densely branched with longer branches. Sensillae slender, with few minute barbs; bases slightly posterior to PL's. Measurements of holotype: AW-103, PW-138, SB-35, ASB-62, PSB-42, AP-45, AMB-19, AM-82, AMA-24, AL-105, PL-107, S-135. Nasus 18 x 50 μm . *Legs:* Coxae densely punctate, leg segments moderately punctate. Distance between setae of coxa I, 57-65. Specialized setae as figured. Branched setae per leg segment, sequentially for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,8,8; tarsus 40, 30, 28. Femur I and II, genu III and tibia III with 1-3 very long, plumose setae. Leg index 1245.

Distribution: Venezuela: Mérida state.

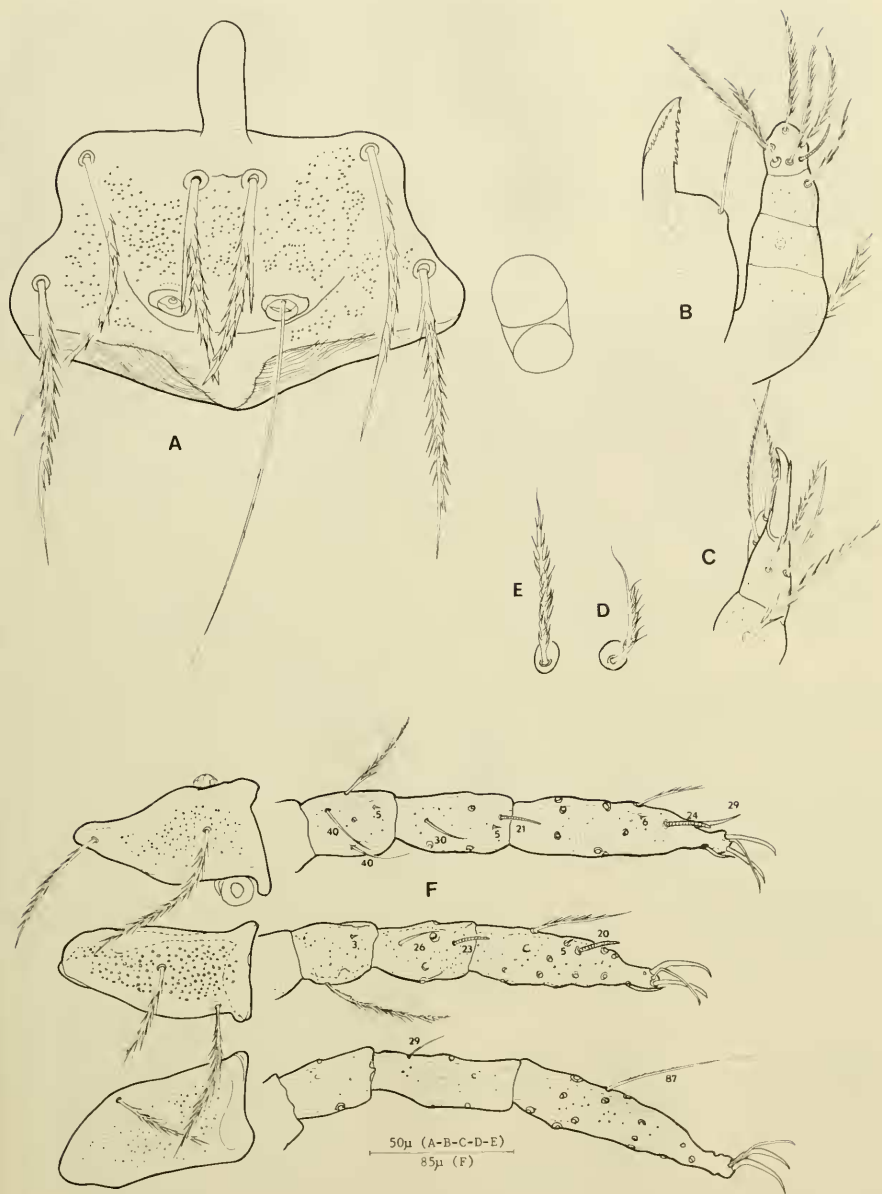


Fig. 11. *Odontacarus tuberculohirsutus*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal genu, tibia and tarsus, dorsal aspect; D, anterosubmedian ventral seta; E, anterosubmedian dorsal seta; F, coxae and leg segments showing specialized setae.

Specimens Examined: Type material, plus the following other Venezuela material: 5, ex *Oryzomys minutus*, Mérida, 4 km W Timotes (Paramito), 3294 m, 16 Sept 1966; 10, ex *O. minutus* and 3, ex *Akodon bogotensis*, Mérida, 7-9 km SE Tabay (Le Coromoto and Laguna Verde) 3160-3785 m, 11-21 Mar 1966.

Remarks: Coxa II occasionally possesses 3 instead of 2 setae, and the degree of striation on the posterior margin of the scutum varies con-

siderably among specimens. None of the material examined appeared to be engorged. The name was chosen in reference to the large, tuberculate setal bases and the large number of idiosomal setae.

Odontacarus (O.) vanderhammeni n. sp.
(Fig. 12)

Type Data: Holotype and 2 paratypes, RML #49039, ex *Oryzomys minutus*, Venezuela, Mé-

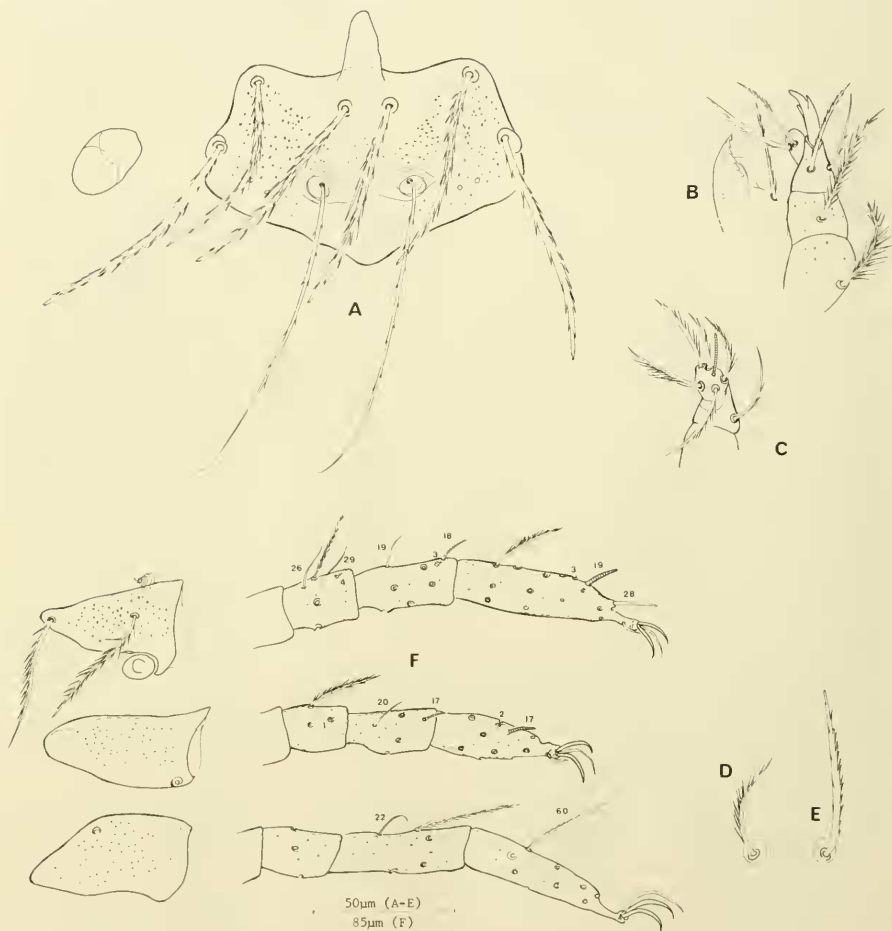


Fig. 12. *Odontacarus vanderhammeni*, new species. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, antersubmedian ventral seta; E, middorsal seta; F, coxae and leg segments showing specialized setae.

rida, 4 km N Timotes (Paramito), 3294 m, 11 Feb 1966; other paratypes: 1 each, RML #48915 and 48902, ex *O. albicularis*, 1 each, RML #s 48931 and 48918, ex *Thomasomys lugens*, and 1 RML #48909, ex *Marmosa dryas*, Venezuela, Trujillo, 14 and 15 km E Trujillo (hda. Misisí), 2220-2360 m, 20 and 24 Jan 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Separates from other species with tuberculate setal bases by the following combination of characters: Sparsely barbed and tapered dorsal setae, angulate posterior scutal margin, moderately long accessory branches on anterosubmedian scutal setae, and unisetos coxa II.

Description: Idiosoma: Ovoid; length and width of holotype (engorged): 578 and 418. Eyes 2/2 in obscure plates; anterior 16, posterior 14 μm in diameter. Approximately 100 dorsal setae, in uneven rows, 41-75 μm long, laterally and posteriorly. Two humerals 80 μm long. Dorsal setae stout, tapered, sparsely branched with few closely appressed barbs on ventral side of setae. Venter with 2 sternals plus about 60 slender ventral setae, 38-65 μm long, and about 14 posterior setae similar to dorsals. Anterior ventrals with long branches, becoming gradually stouter until 2-3 rows posterad of anus. Anus at about fifth row of ventral setae. **Gnathosoma:** Cheliceral bases densely punctate. Blades 43 μm long with 6 dorsal and 7-8 ventral teeth. Palpal formula B/B/BBB; femoral and genual setae densely branched with long branches, dorsotibial moderately branched, laterotibial and ventrotibial with few barbs. Palpotarsalae 14 μm ; branched tarsal setae moderately branched. Tibial claws trifurcate, axial prong largest. Galealae moderately branched. **Scutum:** Moderately punctate, shaped as figured; anterior margin mildly sinuate, posterior margin angulate. Anterior setae more densely branched than posterolateral setae, AM with moderately long accessory branch. Sensillae sparsely barbed, bases markedly posterior to PL's. Measurement of holotype: AW-85, PW-109, SB-34, ASB-46, PSB-39, AP-33, AMB-18, AM-75, AMA-23, AL-74, PL-84, S-120. Nasus 13 x 20. **Legs:** Coxae moderately punctate, other leg segments sparsely punctate. Distance between coxa I setae 41 μm . Femur I and II, genu and tibia III with long plumose setae, other branched setae densely to moderately branched. Branched setae per segment for legs

I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6 (9,7,7 in one specimen); tarsus 40+,23,18. Leg index 1111.

Distribution: Venezuela, Trujillo and Mérida states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. L. van der Hammen, Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands.

Odontacarus (O.) vergrandi n. sp.

(Fig. 13)

Type Data: Holotype and 9 paratypes, RML #52811, ex *Thomasomys laniger*, Venezuela, Mérida, 3 km W Timotes (near Paramito), 3147 m, 15 Feb 1966; other paratypes: 2, RML #52813, ex *T. laniger*, 1, RML #52812 and 3, RML #52810, ex *Oryzomys minutus*, Venezuela, Mérida 3 and 4 km W Timotes (near Paramito), 3140 to 3230 m, 15 and 16 Feb 1966; 4, RML #52808, ex *Lonchorina aurita*, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from *O. comosus comosus*, n. ssp. by the slightly different shape of scutum, more and stouter idiosomal setae, and the branched setae of tibia I, II, and III numbering 9-7-7, respectively.

Description: Idiosoma: Broad ovoid. Length and width of holotype (unengorged) 288 and 252. Eyes 2/2 in plates; anterior 16 posterior 14 μm in diameter. Dorsal and ventral setal bases large, tuberculate. Dorsal setae 45 to 96 μm , longer laterally and posteriorly with 4 rows of setules. Total dorsal setae about 110 in uneven rows. Humerals not distinguishable. Venter with two sternals and 35 slender pre-anals (40-50 μm), plus about 20 postanal and laterals similar to dorsals. Anus at fourth row of ventral setae. Spiracles prominent, adjacent to anterior margin of coxa I. Tracheae convoluted, visible throughout idiosoma. **Gnathosoma:** Cheliceral bases moderately punctate; blades 54 μm long with 7 dorsal and 6-7 ventral teeth, widely spaced. Palpal formula B/B/BBB; latero- and ventrotibial sparsely branched, others moderately branched. Palpal tarsala about 12 μm ; branched tarsal setae long and slender with long branches. Tibial claws trifurcate, axial prong largest. Galealae with few barbs. **Scu-**

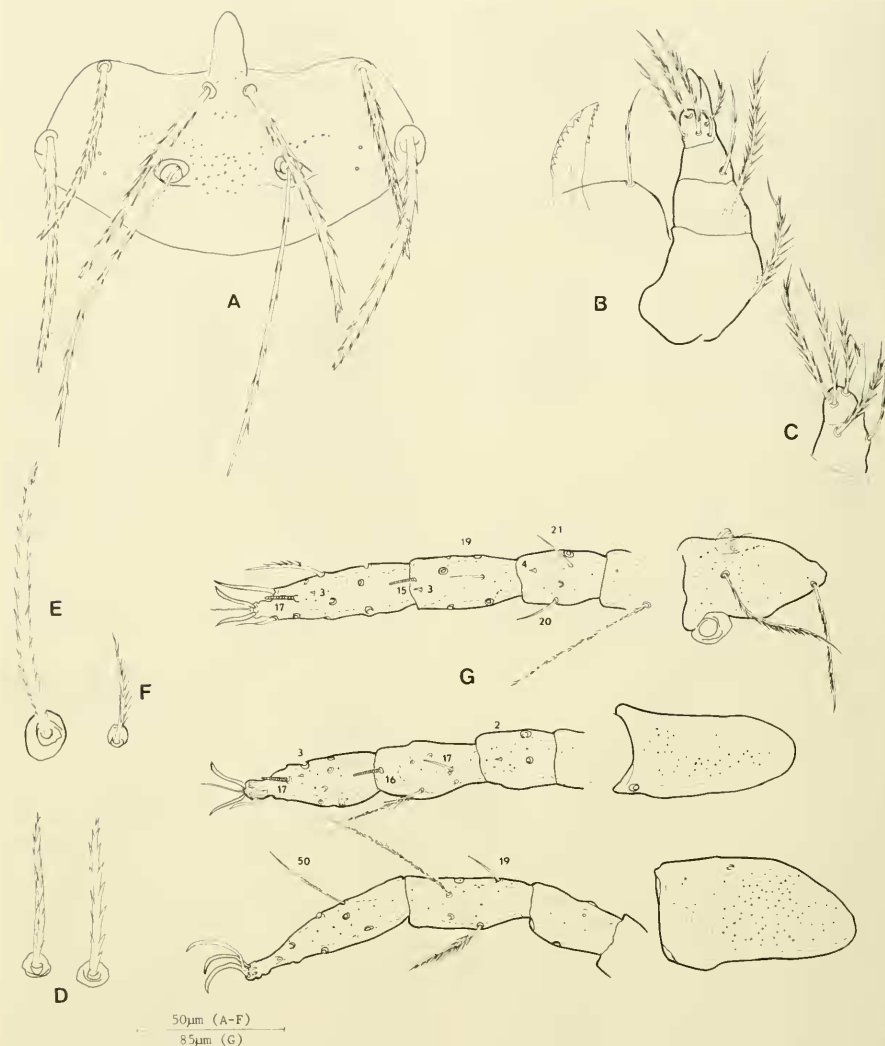


Fig. 13. *Odontacarus vergrandi*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tibia and tarsus, dorsal aspect; D, anterosubmedian dorsal seta—left, dorsal aspect, right, ventral aspect; E, anterolateral dorsal seta; F, anterosubmedian ventral seta; G, coxae and leg segments showing specialized setae..

tum: Sparsely punctate. Shaped as figured with slightly sinuate anterior margin and broadly rounded posterior margin. Scutal setae similar to dorsals; AM's with short, stout accessory branch; AL's apparently lacking barbs on con-

cave side of curvature. Sensillae delicately barbed; barbs longer apically; bases slightly posterior to PL's. Measurements of holotype: AW-92, PW-132, SB-38, ASB-40, PSB-29, AP-32, AMB-15, AM-86, AMA-10, AL-67, PL-77, S-116.

Nasus 12 x 21. *Legs*: Coxa I sparsely punctate, punctae coarse; coxae II and III moderately punctate, punctae fine. Leg segments sparsely punctate. Distance between coxa I setae 45-47. Parasubterminala I lacking. Femur I, II, and III, genu II, and tibia III each with 1 or 2 long, plumose setae. Mastitarsala III minutely barbed. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 30,20,16-17. Leg index 1060.

Distribution: Venezuela, Mérida and Trujillo states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. P. H. Vercammen-Grandjean, G. W. Hooper Foundation, University of California Medical Center, San Francisco.

Subgenus *Tarsalacarus* Vercammen-Grandjean

Odontacarus (*Tarsalacarus*) Vercammen-Grandjean, 1968:121 [Type species: *Acomatacarus bakeri* (Hoffmann), original designation].

Diagnosis: Larvae with tarsala III; cheliceral blades with ventral row of teeth only.

Redescription: Larvae possessing cheliceral blades with ventral row of teeth only. Palpotibial claws quadrifurcate on neotropical species. Palpal formula B/B/BBB. Tarsala III present, mastitarsala III lacking. Coxa III with blunt projection on anteromedian margin.

Odontacarus (*Tarsalacarus*) *bakeri* (Hoffmann)
(Fig. 14)

Acomatacarus bakeri Hoffmann, 1951:31 [Holotype, larva, *Peromyscus truei gratus*, México; Hoffmann collection, México, D.F.] Greenberg 1952:477 and 482.

Odontacarus bakeri, Brennan 1959:1; Brennan and Dalmat 1960:184; Wharton and Fuller 1952:97.

Diagnosis: Differs from other members of the genus by the subquadrate scutal shape, long-branched scutal and idiosomal setae, densely branched galeal setae, and tarsala III

Redescription (Based on a specimen determined by Hoffmann, see remarks below. Data from original description parenthetically included). *Idiosoma*: Broad ovoid; length and width (engorged) 911 and 625 (type series: 426-790 and 220-373, Hoffmann, 1951). Eyes

2/2; anterior 16, posterior 12 μ m in diameter. Setal bases apunctate. Dorsal setae 42-65 μ m (variable), arranged approximately 2-10-11-12-2-15-12-8+24. Venter with two sternals, 34 preanals, and about 70 postanals. Anus at about fifth row of ventrals. Spiracles prominent, adjacent to anterodistal margin of coxa I. Tracheae obvious to posterior margin of idiosoma, not densely convoluted as original figures indicate. *Gnathosoma*: Cheliceral bases moderately punctate; blades about 45 μ m long, with 1 apical dorsal tooth and 4 or 5 small ventral teeth. Palpal formula B/B/B/BB, all setae moderately to densely branched. Palpotibial claws quadrifurcate; branched palpotibial setae long, heavily branched. Tarsalae 8 μ m. Galealae densely branched. *Scutum*: Shaped as figured, sparsely punctate, punctae indistinct. Posterior margin broadly rounded, anterior margin mildly sinuate; PL's on lateral extension of scutum. Scutal setae similar to dorsals. Sensillae minutely barbed along basal fourth; bases slightly posterior to PL's. Measurements: AW-80, PW-93, SB-28, ASB-39, PSB-26, AP-32, AMB-11, AM-64, AL-48, PL-77, S-80. Nasus 7 x 16. *Legs*: Coxae moderately punctate. Distance between coxae I setae 47 μ m. Parasubterminala I absent. Specialized setae as figured. Mastitarsala III absent. Branched setae per leg segment: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 28,16,15. Leg index 1060.

Distribution: Distrito Federal, México, and Jalapa, Guatemala.

Specimens Examined: 1 larva, ex *Peromyscus truei gratus*, Distrito Federal, México, Mar 1951; 4, ex *Reithrodontomys* sp., and 5, ex *Peromyscus guatemalensis*, Jalapa, Guatemala, Mar 1952.

Other Material: Reported off *Peromyscus guatemalensis*, Guatemala, Mar 1952 and *Baiomys taylori*, México, D.F. (Brennan, 1960).

Remarks: The type material was unavailable at the time of writing, hence the redescription is based on a specimen identified by Dr. Hoffmann as *O. bakeri*. Considerable variation is apparent in the specimens examined. Length of setae varied from 35-52 in one specimen to 42-65 in another, and the number of dorsal setae in the series RML#31460 varied from 60 \pm to 90 \pm total.

Contradictions between these findings and the original description include the number of branched tibial and tarsal setae (8,6,6 and 25, 14,16, respectively, in original description) and minute barbs on the sensillae which were described as nude.

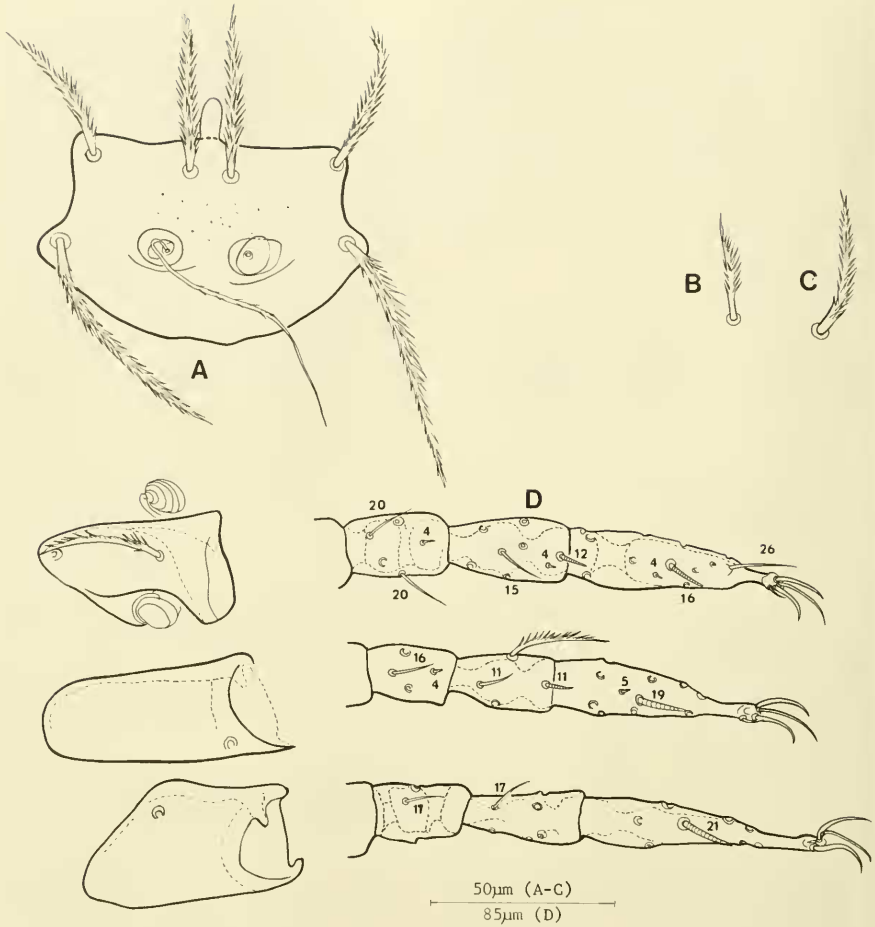


Fig. 14. *Odontacarus (Tarsalacarus) bakeri*. A, scutum; B, anterosubmedian ventral seta; C, anterolateral dorsal seta; D, coxae and leg segments showing specialized setae.

Odontacarus (Tarsalacarus) chiapanensis
(Hoffmann)
(Fig. 15)

Diagnosis: Separated from *O. bakeri* by fewer dorsal setae and the sparsely branched palpal setae.

Acomatacarus chiapanensis Hoffmann, 1948:179 [Holotype, larva; ex undetermined rodent, "Tepeizcuente," Chiapas, México; Hoffmann collection, Ciudad, México]; Greenberg, 1952: 482.

Odontacarus chiapanensis: Brennan, 1959:1; Brennan and Jones, 1959:11; Brennan and Yunker, 1966:224; Loomis, 1969:5.

Description (based on Panama specimens [see remarks]): *Idiosoma*: Ovoid; Length and width, 245-535 and 192-324 (Type material 519-618 and 330-357, Hoffmann, 1948). Eyes 2/2 in plates; anterior 12, posterior 9 µm in diameter. Setal bases normal. Dorsal setae 34-50 µm, longer laterally and posteriorly; arranged approximately: 2 humerals (60 µm)-8-4-6-8-6-6-2 plus

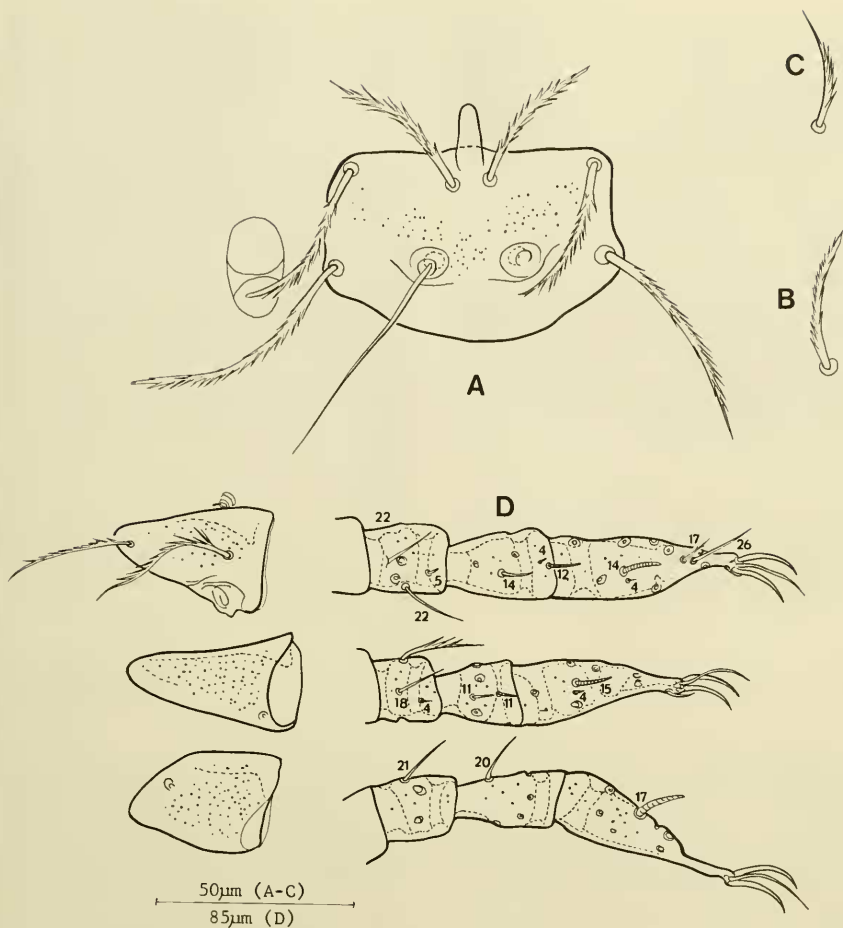


Fig. 15. *Odontacarus (Tarsalacarus) chiapanensis*. A, scutum; B, anterosubmedian dorsal seta; C, anterosubmedian dorsal seta; D, coxae and leg segments showing specialized setae.

5 lateral setae not continuous with dorsal rows (original description [6,4,2]-6-10-8-6-6). Venter with 2 sternals, 28 slender pre-anals (26-34 μm), and 22 postanals similar to dorsals. Anus at fourth row of ventral setae. *Gnathosoma*: Cheliceral bases moderately punctate posteriorly; blades 43 μm long with a single apical dorsal tooth and a row of 5 or 6 ventral teeth. Palpal formula B/B/BBB; genual setae moderately branched, laterotibial nude or with few branches, others sparsely branched. Palpal tarsala 7 μm long; branched tarsal setae sparsely branched.

Tibial claws quadrifurcate, inner prong largest. Galealae sparsely branched. *Scutum*: Sparsely punctate; shaped as figured, posterior margin broadly rounded to semitruncate medially. Scutal setae similar to dorsals. AM with accessory branch located medially (not visible on all specimens). Sensillae nude, bases slightly anterior to PL's. Measurements of one specimen, partially engorged: AW-67, PW-71, SB-21, ASB-29, PSB-19, AP-25, AMB-11, AM-40, AMA-8, AL-42, PL-59, S-72. *Nasus* 6 x 19. *Legs*: Coxa I and III sparsely punctate; coxa II moderately punctate.

Distance between coxa I setae, 38 μm . Parasubterminala I lacking (see remarks). Specialized setae as figured. Mastisetae lacking. Branched setae per leg segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 25,16,15. Leg index 810.

Distribution: Chiapas and Yucatán Peninsula, México; Bocas del Toro, Panamá.

Material Examined: 8 larvae, ex *Proechimys semispinosus*, Bocas del Toro, Panamá, Jan and Apr 1960.

Other Material: Holotype and paratypes, ex unidentified rodent, "Tepiczuinite," Chiapas, México (Hoffmann, 1948:182). Also reported off *Ototylomys phyllotis* and *Peromyscus yucatanicus*, Yucatán Peninsula, México (Loomis, 1969: 5), and *Proechimys semispinosus*, Bocas del Toro, Panamá (Brennan and Yunker, 1966:224).

Remarks: Type specimens were unavailable at the time of writing; however, the presence of a quadrifurcate palpal claw had been observed earlier by Brennan (unpublished notes) while examining a paratype. Other differences from the original description include the branched galeal and palpal laterotibial setae noted by Greenberg (1952:482). The "single branched

parasubterminala" on leg I as noted by Greenberg was found to be 1- or 2-branched and therefore is not considered here as a parasubterminala in the strict sense.

Genus *Sasacarus* Brennan and Jones

Sasacarus Brennan and Jones, 1959:8 [Type species: *Chatia furmani* Hoffmann, 1954, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae possessing spiracles and tracheae, 2 sternal setae, anterolateral projections of the scutum, and empodia on leg tarsi.

Redescription: Larvae parasitic on small rodents. Cheliceral blades with tricuspid cap only. Palpotibial claw with one large prong, several small outer prongs and dorsal and ventral rows of slender prongs. Palpotarsus 7B plus tarsala. Galealae branched. Spiracles and tracheae present. Scutum with anterolateral projections; posterolaterals far forward. Sensillae nude. Two genualae I, a genuala II and III. Coxa I bisetose, coxae II and III unisetose. Mastisetae absent. Femora I, II, and III with 6, 7, and 5 branched setae, respectively. Onychotriches present.

Key to Subspecies

1. Scutal setae very stout, PL's about 60 μm *S. furmani panamensis*
2. Scutal setae not obviously stout, PL's about 45 μm *S. furmani furmani*

Remarks: *Sasacarus* closely resembles the genus *Chatia*, subgenus *Shunsemia* Jameson and Toshioka, in the number of branched setae on the femora of the legs, the form of the palpal setae (femoral and genual setae plumose) and the genuala configuration 2+, 1+, 1 for legs I, II, and III. Vercammen-Grandjean, et al., group *Sasacarus* with the genus *Chatia* on the basis of the branched femoral setae and consider it a valid generic entity. Addition of *S. f. panamensis* n. ssp. supports the generic status.

Sasacarus furmani furmani (Hoffmann)

Chatia furmani Hoffmann, 1954:17 [Holotype, larva; ex *Batomys musculus musculus*, Oaxaca, México; Rocky Mountain Laboratory, Hamilton, Montana].

Sasacarus furmani, Brennan and Jones, 1959:8; Brennan and Yunker, 1966:224.

Diagnosis: Differs from the Panama subspecies by the shorter more slender dorsal setae and branched setae on legs.

Redescription: *Idiosoma:* Ovoid. Length and width of holotype 568 and 408 (idiosoma ruptured, measurements approximate). Eyes single, 14 μm in diameter. Dorsal setae 35-54 μm , longer anterolaterally, sparsely barbed ventrally and densely barbed dorsally; arranged in uneven rows approximately: 11-9-12-2 (lateral) -10-2 (lateral) -10 plus 24 posteriorly. Two sternals and 56 ventrals, 25-38 μm , longest laterally, in uneven rows; anterior setae shorter and somewhat more slender than posterior setae. Anus between fourth and fifth rows of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae traceable to posterior third of idiosoma. *Gnathosoma:* Cheliceral bases apparently apunctate; blades 39 μm long with tricuspid cap only. Palpal formula B/B BBB, moderately to densely branched. Tarsi 7B plus tarsala, setae long, moderately branched. Tibial claws forming a cupped shape, with 1 large prong, 7 or 8 smaller prongs outer and dorsally, becoming more slender proximally, plus row of 6 slender prongs ventrally. Galealae moderately branched with long slender branches. *Scutum:*

Shaped as originally figured by Hoffmann; sparsely punctate. PL's far anterior, AL's on anterolateral extractions of scutum. Anterior margin sinuate, posterior margin broadly rounded. Setae similar to dorsals, densely branched. Sensillae nude. Measurements of holotype: AW-82, PW-84, SB-41, ASB-36, PSB-21, AP-15, AMB-9, AM-27, AL-34, PL-44, S-60. *Legs*: Coxae and leg segments with few punctae. Distance between coxa I setae 44 μ m. Specialized setae as figured for *Sasacarus furmani panamensis* n. ssp.; sub- and parasubterminala lacking. Branched setae moderately plumose, with stiff branches. Apical setae with fewer branches. Tarsal claws with a pair of onychotriches, empodia apparently nude. Branched setae per segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8,6,6; tarsus 28,17,15. Leg index 846.

Distribution: Oaxaca, México.

Material Examined: Holotype only.

Other Records: One paratype, ex *Baiomys musculus musculus*, Oaxaco, México, Panama records (Brennan and Yunker, 1966) are *S. furmani panamensis* n. ssp.

Sasacarus furmani panamensis n. ssp.

(Fig. 16)

Type data: Holotype, RML#44965, ex *Proechimys semispinosus*, France Field, Panama Canal Zone, 8 Sep 1961; Paratypes: 2, RML#40125, ex *P. semispinosus*, Piña, Panama Canal Zone, 13 Dec 1960; 2 RML#44105, ex *P. semispinosus*, France Field, Panama Canal Zone, 16 Nov 1961; 1, RML#35276, ex *P. semispinosus panamensis*, Panamá 7 Jan 1954; 1, RML#44401, ex *P. Tylo-*

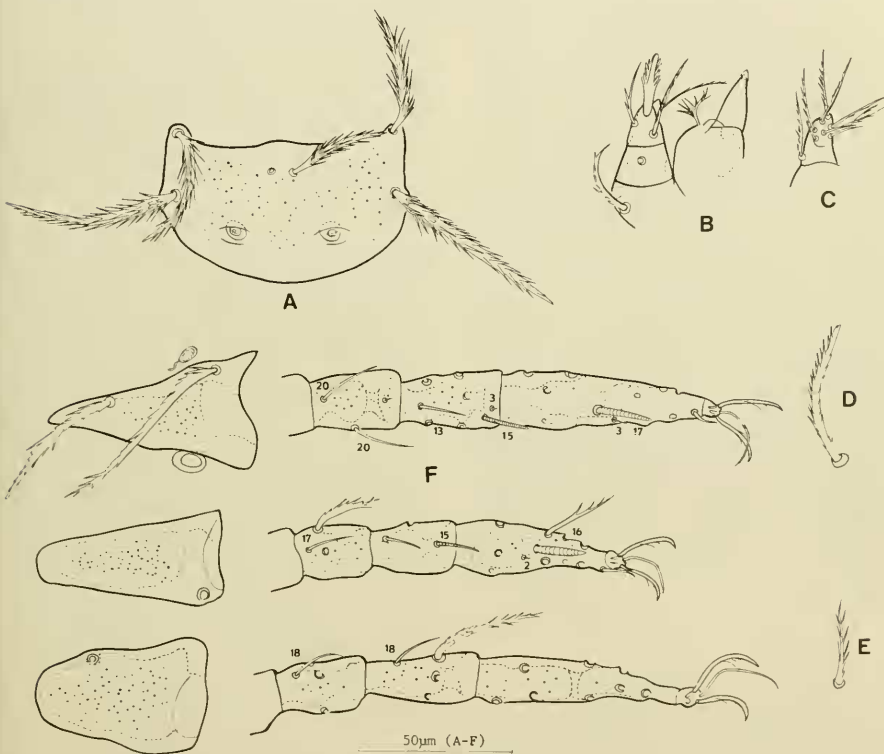


Fig. 16. *Sasacarus furmani panamensis*. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

mys watsoni, Piña, Panama Canal Zone, 7 Feb 1954. C. M. Keenan, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Separates from nominate subspecies primarily by stouter idiosomal, scutal, and leg setae and longer scutal setae.

Description: *Idiosoma:* Broad ovoid to circular (engorged). Length and width of holotype: 452 and 388. Eyes present 12-13 μm in diameter (not seen on holotype). Setal bases not tuberculate, setae stout, 45-51 μm , longer laterally, with 3-4 rows of stout branches, arranged approximately 12-8-8-10-9-6-4-2. Two sternals plus about 66 ventrals, 24-41 μm , shorter and more slender anteriorly, becoming gradually like dorsals posteriorly. Anus between second and third row of ventral setae. Spiracles obvious, between coxa I and palpal coxa. Tracheae visible to mid-idiosoma in some specimens. *Gnathosoma:* Cheliceral bases moderately, lightly punctate. Blades 36 μm long, with tricuspid cap only. Palpal formula B/B/BBB, moderately branched; laterotibial seta slender, sparsely to moderately barbed. Tibial claws with large axial prong, 4 outer prongs, and apical row of smaller prongs dorsally and ventrally. Galealae moderately barbed with long branches. *Scutum:* Shaped as figured, similar to that of *S. furmani*. Sparsely punctate. Setae stouter than dorsals. Sensillae not seen; bases located posterior to PL's. Measurements of holotype AW-70, PW-71, SB-31, ASB-34, PSB-14, AP-18, AMB-9, AM-36, AL-48, PL-62, S-. *Legs:* Coxae moderately punctate, other leg segments sparsely punctate. Distance between coxa I setae 36-38 μm . Specialized setae as figured, sub- and parabterminala lacking. Branched setae stout, moderately branched; setules apparently caducous. Tarsal claws with at least a pair of long onychotriches. Empodia nude. Branched setae per leg segment for legs I, II, and III: Coxa 2, 1, 1; trochanter 1, 1, 1; femur 6, 7, 5; genu 4, 4, 4; tibia 8, 6, 6; tarsus 28, 17, 15. Leg index 776.

Distribution: Panamá.

Material Examined: Type material.

Other Records: Piña, Gamboa Road, Fort Gulick, and France Field, Bocas del Toro province, Panamá. Hosts: *Didelphis marsupialis*, *Heteromys desmarestianus*, and *Proechimys semispinosus*, Nov to Apr 1954-1962 (Brennan and Yunker, 1966:224).

Genus *Wagenaaria* Brennan

Wagenaaria Brennan, 1967:148 [Type species: *Wagenaaria similis* Brennan, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

Redescription: Parasitic on bats. Palpal tarsus 7B plus tarsala. Palpotibial claws with several slender prongs. Cheliceral blades with small tricuspid cap. Scutum with a pair each of anterosubmedian, anterolateral, and posterolateral setae. Sensillae flagelliform, bases far posterad of posterolateral scutal setae. Coxa I bisetose, coxae II and III unisetose. Tarsal claws with long onychotriches, empodia nude.

Wagenaaria similis Brennan

(Fig. 17)

Wagenaaria similis Brennan, 1967:148 [Holotype, larva, ex *Mormoops megalophylla*, Cueva di Ratón, Hato, Curaçao; Rocky Mountain Laboratory, Hamilton, Montana]; Loomis, 1969:5; Vercammen-Grandjean, et al., 1973:64.



Fig. 17. *Wagenaaria similis*. Dorsal aspect of palpus showing shape of tibial claw.

Diagnosis: Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

Redescription: *Idiosoma*: Long ovoid. Length and width of holotype 450 and 305. Eyes lacking. About 200 dorsal setae in uneven rows, 30-52 μ m, longest anterolaterally. Two sternals plus about 140 ventrals, 24-32 μ m long; pre-anals similar to postanals. Anus located at anterior third of ventral setae. All setae slender, moderately barbed. Spiracles and tracheae lacking. *Gnathosoma*: Cheliceral bases moderately punctate, blades 37 μ m long, with small bicuspid cap. Palpal formula B/B/BBB, all setae stout, with long setules (ca. 10 μ m). Tarsalae 5-8 μ m. Tarsus 7B, branched setae sparsely branched. Tibial claws with ventral row of prongs and a few large apical prongs forming a cupped shape. Galealae sparsely barbed. *Scutum*: Shaped as originally figured: Moderately punctate; anterolateral angles acute; posterior margin broadly rounded, with mild indentation medially. Nasus lacking. Scutal setae similar to dorsals. Sensillae nude; bases posterior to PL's. Measurements of holotype: AW-57, PW-69, SB-31, ASB-38, PSB-11, AMB-9, AM-53, AL-39, PL-40, S-85. *Legs*: Coxae moderately to densely punctate, other leg segments sparsely punctate. Specialized leg setae as originally figured, but with microtarsala II laterad of Tarsala II. Tibial formula 2+, 2, 1. Microgenualae and microtibialae 6-7 μ m long. Branched setae per leg segment for legs I, II, and III. Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8, 6,6; tarsus 29,17,17. Branched setae stout, sparsely to moderately branched. Onychotriches long, empodium nude. Leg index 892.

Distribution: México, Curaçao, Venezuela.

Specimens Examined: Holotype and 4 paratypes, ex *Mormoops megalophylla*, Hato, Curaçao, Sep, Oct, and Nov 1948; 1, ex *Pteronotus davyi*, Yaraucy, Venezuela, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967, Dec 1947; and 1, ex *P. parnellii*, Sucre, Vene-

zuela, 12 km NE Güiría (Ensenada Cuaranta), 90 m, 17 Jun 1967, Jun and Dec 1967.

Other Records: Reported off *Mormoops megalophylla* (paratypes), Hato, Curaçao (Brennan, 1967:148), and *Pteronotus davyi*. Yucatán Peninsula, México (Loomis, 1969:5).

Remarks: The Venezuela specimens agree closely with the holotype as did the Mexico specimens (according to Loomis, 1969). The palpal claw is reillustrated to indicate differences from the original illustration. In addition, the microtarsala I is correctly placed laterad of tarsala I.

Vercammen-Grandjean, et al. (1973) place *Wagenaarina* as a subgenus of *Chatia* Brennan, 1946, on the basis of the number of branched setae on the femora of the legs (6, 7, 5 for legs I, II, and III).

Genus *Whartonia* Ewing

Whartonia Ewing, 1944:102 [Type species: *Hannemania nudosetosa* Wharton, original designation]; Gould, 1956:19; Chen and Hsu 1959: 549; Wharton and Fuller, 1952:104; Dornrow, 1962:1; Vercammen-Grandjean, 1968: 126; Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Larvae with spiracles and tracheae. Cheliceral blades with a row each of large dorsal and ventral teeth. Scutum lacking nasus.

Redescription: Larvae parasitic on bats and occasionally rodents. Cheliceral blades 50-110 μ m long, with dorsal and ventral rows of teeth. Palpotibial claws with three to several prongs. Palpal formula variable, B/B/B $\frac{NN}{BB}$; palpal tarsi 7B plus tarsala. Galealae branched. Tracheae and spiracles present. Scutum subrectangular, often much broader than deep. Sensillae flagelliform; nude or sparsely barbed. Genualae and tibialae variable. Tarsala III present or absent; coxa I bisetose; coxa II unisetose. Mastisetae absent. Idiosomal setae with short, barblike setules, sparsely to moderately branched.

Key to Subgenera and Species

1. Coxa III bisetose, parasubterminala on leg I absent, tarsala III present (subgenus *Whartonia*) 2
- Coxa III unisetose, parasubterminala on leg I present, tarsala III lacking, (subgenus *Asolentria*) 4
- 2(1). Three genualae I, anterolateral angles of scutum acute *W. (W.) angulascuta* n. sp. 3
- Two genualae I, anterolateral angles of scutum not acute
- 3(2). Dorsal setae number about 30, with very appressed, short barbs, nearly nude *W. (W.) nudosetosa*

- Dorsal setae number about 60, densely barbed; setules thornlike W. (W.) *pachywhartoni*
- 4(1). Palpotibial claw trifurcate, Palpal formula B/B/BNN, setules of scutal setae short and thornlike W. (A.) *guerreresis*
- Palpotibial claw pectinate, palpal formula B/B/BNB, setules of scutal setae about 8 μ m long, slender W. (A.) *womersleyi*

Remarks: Although tracheae and spiracles are reportedly absent in the subgenera *Whartonia* and *Asolentria* (Vercammen-Grandjean, 1968:119), neotropical representatives of these taxa were found to possess both. The spiracles are small and located adjacent to the anterior margin of coxa I. Lack of scutal nasus is therefore not coincident with the absence of spiracles and tracheae in these subgenera.

Subgenus *Whartonia* Vercammen-Grandjean

Whartonia (*Whartonia*) Ewing, 1944:102 [Type species: *Hannemania nudosetosa* Wharton]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae with bisetose coxa III, tarsala III, and lacking parasubterminala on leg I.

Description: Larvae large, broad ovoid to circular when engorged. Cheliceral blades about 100 μ m long, with large dorsal and ventral teeth. Palpal formula B/B/BBB; galealae branched; palpotibial claws pentafurcate to pectinate. Scutum much wider than deep; sensillae barbed or nude. Coxa III bisetose; tarsala III present; parasubterminala I lacking.

Whartonia (*Whartonia*) *nudosetosa* (Wharton)

Hannemania nudosetosa Wharton 1938:142 [Holotype, larva; ex *Peropteryx canina canina* (= *P. macrotis*) and *Artibeus jamaicensis*, Yucatán, México: Rocky Mountain Laboratory, Hamilton, Montana]; Hoffman 1944: 56; Vercammen-Grandjean 1968:126.

Whartonia nudosetosa: Ewing, 1944:102; Hoffman 1949:189; Wharton and Fuller 1952:104; Brennan and Jones, 1959:11; Chen and Hsu, 1959:555; Brennan and Dalmat, 1960:185; Hoffman, 1960:4; Vercammen-Grandjean, 1968:126.

Diagnosis: *W. nudosetosa* separates from *W. angulascuta* n. sp. by the form and pattern of dorsal setae palpal formula B/B/BNN, and non-acute anterolateral angles of scutum.

Redescription: *Idiosoma*: Nearly circular; length and width of holotype 710 and 620. Eyes 2/2, plate lacking; anterior II, posterior 10 μ m in diameter. Dorsal setae appearing almost nude, with minute nubbins. Dorsal setae 40-50 μ m, longer anteriorly; 2 humerals (62 μ m)-8-2

(lateral)-6-2 (lateral)-8-6-2. Ventral setae: 2 sternals with long setules (broken in most specimens); 30-34 slender pre- and para-anals 30-40 μ m, with long slender setules or stubs of broken setules; and about 16 postanals similar to dorsals. Anus just posterad of third row of setae. Spiracles small, adjacent to anterior margin of coxa I (not visible in holotype). Tracheae visible in some specimens to posterior third of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate, punctae fine. Palpal formula B/B/BBB, femoral and genual setae slender, with a few branches; dorsotibial much heavier with numerous, very small branches. Galealae sparsely branched. Palpotibial claw pentafurcate. Cheliceral blades about 87 μ m (absent on holotype); teeth large and curved, numbering about 21 dorsally and 20 ventrally. *Scutum*: Shaped as figured by Brennan and Dalmat (1960:185, Fig. 3); much broader than deep, subquadrate, with sinuate posterior margins. Sensillae nude; posterior to PL's. Scutal setae similar to dorsals. Measurements of Holotype (measurements of Venezuela specimen in parentheses): AW-138 (130), PW-148 (140), SB-54 (50), ASB-41 (48), PSB-10 (8), AP-22 (22), AMB-13 (11), AM-89 (79), AL-58 (56), PL-67 (67), S- (-). *Legs*: Coxae lightly punctate. Distance between coxa I setae 40. Legs relatively long, not heavily sclerotized. Specialized setae as figured by Brennan and Dalmat (1969:185, Fig. 3). Genual formula 2+,1,1. Tibial formula 2+,2,1. Microsetae 3-11 μ m long. Branched setae per leg segment, sequentially for legs I, II, and III: Coxa 2,1,2; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus approximately 24,21,24 (33,29,27 on Venezuela specimen). Tarsal claws nude. Leg index 1075.

Distribution: México, West Indies, Trinidad, Colombia, Venezuela, and Guatemala.

Specimens Examined: Holotype and 2 paratypes, ex *Artibeus jamaicensis* and *Peropteryx canina canina*, [= *Peropteryx macrotis*], Yucatán, México, Aug 1936:1. *Glossophaga soricina*, Sinaloa, México, Jul 1964:1. *Mimon cozumelae*, Yucatán, México, Jul 1962; larvae off 89 Venezuela bats, as follows: 25, ex 6 *Peropteryx kappleri*; 3 ex 1 *Noctilio labialis*; 5, ex 1 *Chrotopterus auritus*; 1 ex *Glossophaga longirostris*; 109,

ex 20 *G. soricina*; 28, ex 9 *Lionycteris spurrelli*; 9, ex 4 *Anoura caudifera*; 2, ex 2 *A. geoffroyi*; 6, ex *Anoura* sp. A, 38, ex 11 *Carollia brevicauda*; 68, ex 23 *C. perspicillata*; 2, ex 2 *Sturnira lilium*; 2, ex 1 *Vampyrops aurarius*; 1 ex *Chiroderma villosum*; 1 ex *Artibeus jamaicensis*; 1, ex *Ameritrida centurio*; 7, ex 3 *Desmodus rotundus*. Collected throughout the year except Dec and Jan 1966-68, from TF Amazonas, Apure, Barinas, Bolívar, Carabobo, Distrito Federal, Falcón, Mérida, Miranda and Zulia.

Other Records: Recorded off: *Carollia perspicillata azteca*, Alta Vera Paz, Guatemala (Brennan and Damat, 1960:185); Leaf-nosed bat, Jamaica (Brennan, 1953:294); *Carollia perspicillata*, Quintana Roo, and *Artibeus jamaicensis*, *Desmodus rotundus*, *Mimon cozumelae*, and *Glossophaga soricina*; Yucatán, México (Loomis, 1969:6); *Nycteris borealis* and unidentified bats, Puebla, México, (Hoffman, 1948:189); *Desmodus rotundus*, La Fontaine Cave, Trinidad. (Brennan and Jones, 1960:496); and *C. perspicillata*, Tamana Bat Cave, Trinidad (Brennan, 1967:153).

In addition, specimens from Dept. Meta, Colombia, off *Molossus major*, are on deposit in the Rocky Mountain Laboratory, Hamilton, Montana.

Remarks: The presence of 2 coxa III setae, which has not previously been reported, was observed on the holotype as well as on all other specimens studied. Specimens examined indicated a clinal increase in size of the South America specimens over the original specimens from Yucatán, México, to South America, and also showed an increase in the number of setae on the tarsi of the legs. Comparison of the leg index and number of branched setae on the tarsi of legs I, II, and III for specimens from Yucatán, Costa Rica, and Venezuela follows: Yucatán (holotype), leg index 1075, branched setae 24,21,24; Costa Rica, leg index 1280, branched setae 33, 27, 23-24; Venezuela, leg index 1390, branched setae 33, 29, 27. A specimen from Sinaloa, México, collected in 1960, had a leg index of 1080 and approximately 30, 22, 20 branched setae on legs I, II, and III, respectively. Although the type material seen is too poor to accurately count the branched setae of the legs, it is evident that the México material examined has fewer branched tarsal setae than the specimens from Costa Rica and Venezuela. This variation may be contributed to the increase in size as referred to by Vercammen-Grandjean, et al. (1973:54), "Gigantism often favors an increase in the number of barbed setae, predominantly on tarsus and tibia."

Whartonia (*Whartonia*) *pachywhartoni*
Vercammen-Grandjean

Whartonia pachywhartoni Vercammen-Grandjean, 1966:282 [Holotype, larva; ex *Micronycteris megalotis*, Brazil; U.S. National Museum, Washington, D.C. (See remarks below)].

Diagnosis (based on original description): *W. pachywhartoni* differs from other neotropical *Whartonia* species by the densely barbed dorsal setae and the six-pronged palpotibial claws.

Distribution: Brazil: Lagoa Ltd.

Specimens Examined: None.

Records: Holotype and 5 specimens only; ex *Micronycteris megalotis*, Lagoa Ltd., Brazil, 10 Apr 1962, M. G. Seeva, collector.

Remarks: Specimens of this species could not be located. Apparently the author's shipment of type material to the United States National Museum coincided with the transfer of the U. S. N. M. chigger collection to the Rocky Mountain Laboratory and was misplaced.

Whartonia (*Whartonia*) *angulascuta* n. sp.
(Fig. 18)

Type data: Holotype and 3 paratypes, RML #52990, and 1 paratype 52784, ex *Carollia perspicillata*, Venezuela, Falcón, 11 km NE Mirimire, (La Pastora), 250 m, 21 Nov 1967. Ten paratypes: 1, RML#52752, ex *C. brevicauda*, Venezuela, Monagas, 5 km NW Caripe (San Agustín), 1,160 m, 26 Jun 1967; 2, RML#54829, 5, RML#55886, ex *Chrotopterus auritus*, Venezuela, Falcón, 12 km ENE Mirimire (La Pastora), 220 m, 14 Nov 1967; 2, RML#52712, *Diphyllia ecaudata*, Venezuela, Monagas, 3 km SW Caripe (Hacienda Tucuito), 854 m, 11 Jul 1967; N. E. Peterson, F. Brown, J. Matson, R. B. and P. B. Peacock, collectors.

Holotype and 5 paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: *W. (W.) angulascuta* n. sp. differs from other Neotropical species by acute anterolateral scutal angles and by numerous genualae on leg III.

Description: *Idiosoma:* Broadly ovoid, length and width of holotype 736 and 435. Eyes 2/2: anterior 20, posterior 17 μ m in diameter; plates lacking. Dorsal setae moderately barbed, se-

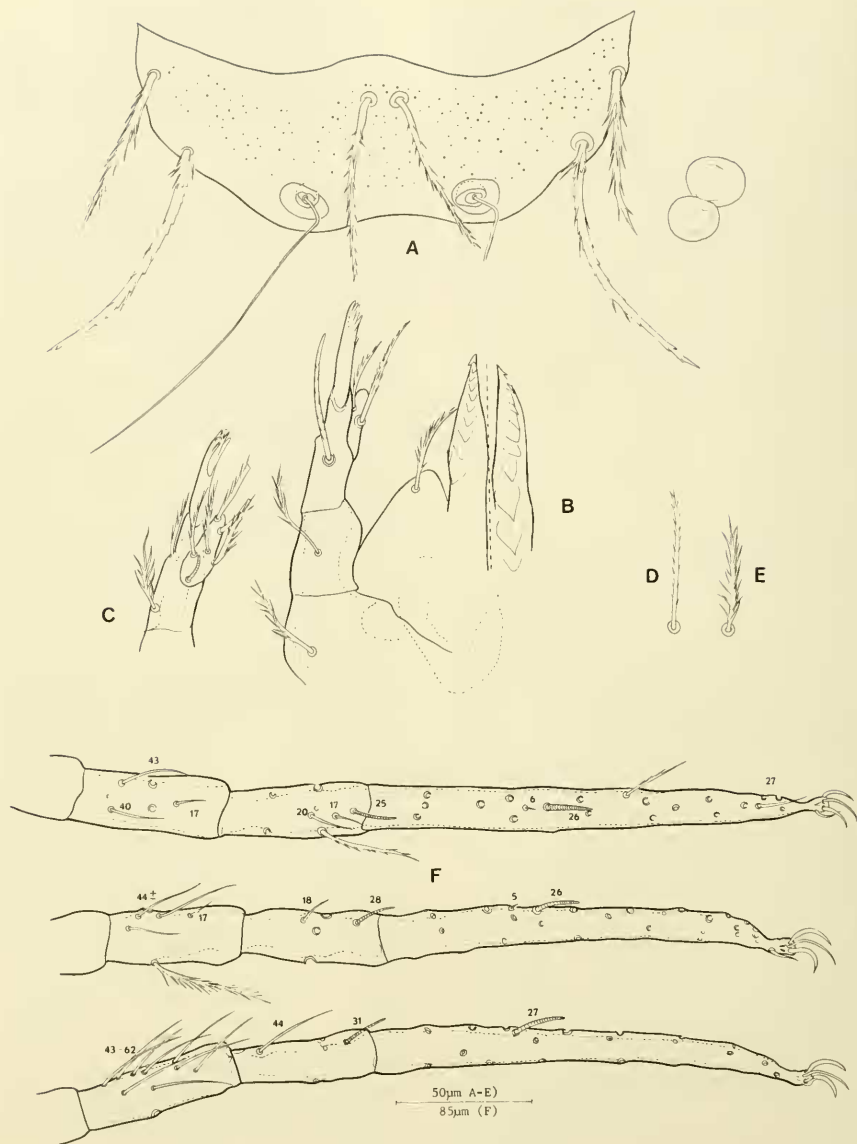


Fig. 18. *Whartonia angulascuta*, new species. A, scutum; B, palpus, dorsal aspect, and cheliceral blade—left, dorsal aspect, right, ventral aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, leg segments showing specialized setae.

tules very short and appressed, appearing as nubbins; humerals 66 μm , others 58-78; arranged approximately 2-11-2-9-2-9-6-2 (variable). Ventral setae: 2 sternals; about 40 slender preanal and para-anal setae with longer setules 37-60 μm , para-anals longest; plus about 32 post-anals similar to dorsal. Anus located at fourth row of ventral setae. Spiracles small; tracheae apparent in less engorged specimens. *Gnathosoma*: Cheliceral bases moderately punctate; palpal formula B/B/BBB, setae long, with few long setules; palpotarsus 7B plus tarsala; galealae sparsely branched; palpotibial claws apparently pentafurcate; cheliceral blades 111 μm long, with about 8 dorsal and 15 ventral teeth. *Scutum*: Shaped as figured; anterolateral angles acute; sensillae nude; bases posterior to PL's. Other scutal setae similar to dorsals, with longer setules. Measurements of holotype: AW-170, PW-146, SB-58, ASB-59, PSB-11, AP-29, AMB-12, AM-67, AL-55+, PL-95, S-131. *Legs*: Long and slender, with little intermedullary space. Specialized setae as figured; parasubterminala absent. Branched setae per leg segment, sequentially for legs I, II, and III: Coxa 2, 1, 2; trochanter 1,1,1; femur 6,6,4; genu 4,4,4; tibia 8,6,6; tarsus about 50-60,56,45. Number of tibialae and genualae variable among specimens.

Distribution: Venezuela: Monagas and Falcón states.

Specimens Examined: Type specimens.

Remarks: The genualae varied from 3 to 4 on leg II and from 7 to 11 on leg III. The distal tibiala III was absent from both legs of 1 specimen, and from 1 leg of 2 specimens. No differences in the number of branched setae were noted on segments where variations in specialized were found. The heavy sclerotization of the legs is similar to that described for *W. pachychartoni*. The name refers to the acute anterolateral scutal angles.

Subgenus *Asolentria* Vercammen-Grandjean

Whartonia (*Asolentria*) Vercammen-Grandjean, 1968:126 [Type species: *Whartonia trinidadensis* Brennan and Jones, 1960:496, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae separate from the nominate subgenus by unisetose coxa III, parasubterminala on leg I, and absence of tarsala III.

Redescription: Larvae large, parasitic on bats. *Idiosoma* semicircular when engorged. Cheliceral blades about 50 μm long, with dorsal and

ventral teeth, and dorsal, subapical hook. Palpal claws trifurcate to pentafurcate. Palpal formula variable. Galealae branched. Scutum deep, subrectangular; sensillae flagelliform. Tracheae and spiracles present, minute. Coxa III unisetose; subterminala and parasubterminala present on leg I. Tarsala III lacking.

Whartonia (*Asolentria*) *guerrerensis* Hoffman

Whartonia guerrerensis Hoffmann, 1960:5 [Type species: ex *Mormoops megalophylla*, Guerrero, México: Hoffman collection, Ciudad, México]; Brennan, 1967:153; Loomis, 1969:5.

Whartonia trinidadensis Brennan and Jones, 1960:496 [Type species: *Whartonia trinidadensis*, ex *Mormoops megalophylla*, Tamana Cave, Trinidad; Rocky Mountain Laboratory, Hamilton, Montana].

Whartonia (*Asolentria*) *trinidadensis*: Vercammen-Grandjean 1968:126.

Diagnosis: *W. guerrerensis* differs from *W. (A.) womersleyi* by the trifurcate palpotibial claw and short thornlike barbs on scutal setae.

Redescription (Based on Venezuela specimens. See remarks below): *Idiosoma*: Nearly circular when engorged, length and width of one engorged specimen: 550 and 475. Eyes 2/2 in indistinct plates; anterior 10, posterior 6 μm in diameter. Humerals 54 μm ; dorsal setae 44-58 μm longer laterally and posteriorly, sparsely branched, with short thornlike setules. Dorsal formula approximately 2 (humerals) -8-10-4 (lateral) -11-4 (lateral) -13-2-10-6-2-2. Ventral setae: 2 sternals; 30 pre-anals in uneven rows (37-43 μm), the first 3 rows with longer setules; and 28 post-anals, similar to dorsals. Spiracles minute, visible in most specimens only as small portion of trachea adjacent to or under antero-medial margin of coxa I. Tracheae traceable for only few micrometers. *Gnathosoma*: Cheliceral blades prominent, about 58 μm long with about 13 large ventral teeth, 8 small dorsal teeth and 1 large dorsolateral subapical tooth. Palpal formula B/B/BNN; femoral and genual setae with 1 or 2 barbs; genual very long and slender; dorso-tibial thicker and densely branched with short fine branches. Palpotarsus 7B plus tarsala; setae sparsely barbed, ventral setae usually appearing nude. Galealae with a few inconspicuous barbs. *Scutum*: Shape conforms to original illustration. Subrectangular, anterior and posterior margins slightly sinuate; punctae light and sparse. Scutal setae similar to but stouter than dorsals; sensillae with 1 or 2 barbs. Measurements of Venezuela specimen (measure-

ments of holotype in parentheses, according to Hoffman, 1960): AS-81 (78), PV-84 (81), SB-26 (28), ASB-25 (26), PSB-17 (15), AP-30 (28), AM-49 (40), AMB-8 (-), AL-38 (36), PL-53 (46), S-76+ (más de 60). *Legs*: Coxae moderately punctate; all other segments lightly punctate. Specialized setae as originally figured. Genuala formula 2+,1+,1; tibiala formula 2+,2,1. Branched setae sparsely branched; number per segment listed sequentially for Legs I, II, and III. Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 5,6,6; tarsus 20,17,15. Leg index 874. Tarsal claws with a pair of onychotriches, apparently easily broken. Empodia nude.

Distribution: Bahamas, Curaçao, Colombia, México, and Venezuela.

Specimens Examined: Eleven larvae from Venezuela; 2 ex *Mormoops megalophylla*, Sucre, 9 km NE Güiria (Ensenada Cuarenta), 1 m, 5 Jun 1967; 9 ex 3 *M. megalophylla*, 10 km NE Güiria (Río Salado), 90 m, 7 Jun 1967.

Other Records: Holotype and a paratype, ex *Mormoops megalophylla*, Guerrero, México (Hoffman, 1960:7). Also reported off: *Mormoops megalophylla*, Tamana Cave, Trinidad (Brennan and Jones 1960:496); *M. megalophylla*, Hato, Curaçao and Cueva de Quadirikiri, Aruba; *Erophylla sezekorui*, New Province Bahamas; and *Peropteryx macrotis*, Isla Margarita, Venezuela (Brennan, 1967:153). In addition, the Rocky Mountain Laboratory collection includes specimens off *Mormoops megalophylla*, Apr 1967, Macarequa, Colombia.

Remarks: Type material for *W. guerrerensis* was not obtainable at the time of writing. The description of a Venezuela specimen, therefore, was used primarily to enlarge upon the original description. Measurements of the Venezuela specimen are overall larger than those of the holotype. Brennan's description of the synonym, *W. trinidadensis*, also shows some increase in size over the scutal measurements listed by Hoffmann in the original description. A similar increase in size of Venezuela specimens in comparison with Mexico representatives was also noticed in *W. nudosetosa*.

Whartonia (Asolentria) womersleyi
Brennan and Dalmat

Whartonia womersleyi Brennan and Dalmat, 1960:185 [Holotype, larva, ex *Balantipteryx io*, Guatemala: Field Museum of Natural History].

Diagnosis: *W. womersleyi* differs from other neotropical *Whartonia* species by the pectinate

palpal claws and single dorsal teeth on the cheliceral blades.

Redescription: (based on paratypes and original description): *Idiosoma*: Nearly circular. Length and width of one paratype, 924 and 721. Eyes 2/2. Body setae moderately branched, setules barblike. DF approximately: 2 humerals (70 μ m) 6-10-2 (lateral) 8-12+24, (62-69 μ m). Two sternals, plus about 48 ventral setae; pre-anals and postanals similar to dorsals (49-66 μ m). Spiracles visible only as opening to tracheae, adjacent to anterior margin of coxa I. Tracheae visible only near coxa I. *Gnathosoma*: Cheliceral blades 50 μ m, as shown in original description with large dorsal tooth, several small anteroventral teeth, and large ventral teeth posteriorly. Calcaea apparently branched. Palpal formula B/B/??? (B/B/BNB, Brennan and Dalmat, 1960); palpotarsi 7B plus tarsala. *Scutum*: Not completely visible on 2 paratypes observed. Shape conforms to original illustrations, nearly quadrate, deep, sparsely punctate, posterior margin broadly rounded. Sensillae branched with few very long slender branches. Scutal setae similar to dorsals, with longer setules. Measurements of one paratype with measurements of holotype in parentheses (from Brennan and Dalmat, 1960). AW-81 (83), PW-87 (88), SB-28 (30), ASB-40 (40), PSB-16 (22), A-32 (33), AMB-10 (-), AM-77 (72), AL-56 (61), PL-57 (61), S-about 81. *Legs*: Specialized setae as originally figured; sclerotization not obvious. Genuala formula 2+,1,1; tibiala formula 2+,2,1. Parasubterminala I present and may have a few barbs; branched setae not plumose, moderately branched, with long, stiff setules; branched setae per segment, listed sequentially for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; tibia 5,6,6; tarsus 20,15,14. Tarsal claws paired with onychotriches apparent on some claws; empodium nude. Leg index 1113 (paratype).

Distribution: Guatemala and British Honduras.

Specimens Examined: Two paratypes ex *Balantipteryx io*, Guatemala, Alta Vera Paz, May 1948; 3 ex *B. io*, British Honduras, Cayo District, Jul 1972, E. J. Spieka, collector.

Other Material: Holotype and 1 paratype ex *Balantipteryx io*, Alta Vera Paz, May 1948. (Brennan and Dalmat, 1960:185).

Remarks: The 2 paratypes studied were in poor condition, making accurate scutal measurements and setal counts difficult. Differences from the original description noted in the para-

types were the presence of onychotriches, slightly different counts of the branched setae on tarsi of the legs, and branched sensillae. The only specimen from British Honduras possessing

cheliceral blades showed 8 small dorsal teeth on one blade and 5 on the other in addition to the large subapical tooth.

HOST-PARASITE LIST

Class Reptilia

Order Squamata

- Tropidurus peruvianus*
- Odontacarus australis*
- Unidentified lizard
- Odontacarus australis*

Class Aves

Order Galliformes

- Odontaphorus erythrops*
- Odontacarus tubercularis*

Order Cuculiformes

- Neomorphis geoffroyi salicini*
- Odontacarus tubercularis*
- Unidentified bird
- Odontacarus comosus comosus*
- Odontacarus mastigophorus*

Class Mammalia

Order Marsupiala

- Monodelphis brevicaudata*
- Odontacarus tubercularis*
- Marmosa fuscata*
- Odontacarus comosus novemsetus*
- O. sunniana*
- O. tubercularis*
- Marmosa dryas*
- Odontacarus comosus comosus*
- O. canderhammeni*
- Marmosa robinsoni*
- Odontacarus tubercularis*
- Marmosa* sp. A
- Odontacarus tubercularis*
- Philander opossum*
- Odontacarus tubercularis*
- Didelphis marsupialis*
- Odontacarus sunniana*
- O. tubercularis*
- Sasacarus furmani panamensis*
- Didelphis opossum* [= *Philander opossum*]
- Leeuwenhoekia verduni*

Order Insectivora

- Cryptotis thomasi*
- Odontacarus dienteslargus*

Order Chiroptera

- Saccopteryx bilineata*
- Odontacarus tubercularis*
- Peropteryx macrotis*
- Whartonia guerrerensis*
- Whartonia nudosetosa*
- Peropteryx kappleri*
- Whartonia nudosetosa*
- Balantiopteryx io*
- Whartonia womersleyi*
- Noctilio labialis*
- Whartonia nudosetosa*
- Pteronotus davyi*
- Wagenaaria similis*
- Pteronotus parnelli*

- Wagenaaria similis*
- Mormoops megalophylla*
- Wagenaaria similis*
- Whartonia guerrerensis*
- Micronycteris megalotis*
- Whartonia pachywhartoni*
- Micronycteris microtus*
- Odontacarus tubercularis*
- Lonchorhina aurita*
- Odontacarus schoenesetosus*
- O. vergrandi*
- Mimon cozumelae*
- Whartonia nudosetosa*
- Phyllostomus hastatus*
- Odontacarus tubercularis*
- Chrotopterus auritus*
- Whartonia angulascuta*
- Whartonia nudosetosa*
- Glossophaga longirostris*
- Whartonia nudosetosa*
- Glossophaga soricina*
- Whartonia nudosetosa*
- Lionycteris spurrelli*
- Whartonia nudosetosa*
- Anoura caudifera*
- Whartonia nudosetosa*
- Anoura geoffroyi*
- Whartonia nudosetosa*
- Anoura* sp. A
- Whartonia nudosetosa*
- Carollia brevicauda*
- Odontacarus tubercularis*
- Whartonia angulascuta*
- W. nudosetosa*
- Carollia perspicillata*
- Whartonia angulascuta*
- W. nudosetosa*
- Carollia perspicillata azteca*
- Whartonia nudosetosa*
- Sturnira lilium*
- Whartonia nudosetosa*
- Vampyropus aurarius*
- Whartonia nudosetosa*
- Vampyropus helleri*
- Odontacarus tubercularis*
- Vampyressa pusilla*
- Odontacarus tubercularis*
- Chiroderma villosum*
- Whartonia nudosetosa*
- Artibeus jamaicensis*
- Odontacarus schoenesetosus*
- Whartonia nudosetosa*
- Ametrida centurio*
- Whartonia nudosetosa*
- Erophylla sezekorni*
- Whartonia guerrerensis*
- Desmodus rotundus*
- Whartonia nudosetosa*
- Dinhylla caudata*
- Whartonia angulascuta*
- Eptesicus montosus*

- Albeckia albecki*
Odontacarus tubercularis
Lasiurus borealis
Whartonia nudosetosa
Histiotes sp. A
Albeckia albecki
Antrozous pallidus pacificus
Albeckia albecki
Molossus major
Whartonia nudosetosa
 Order Lagomorpha
Sylvilagus floridanus
Odontacarus tubercularis
Sylvilagus floridanus chiapensis
Odontacarus mastigophorus
 Order Rodentia
Sciurus granatensis
Odontacarus sunnianaec
O. tubercularis
Liomys adpersus
Odontacarus tubercularis
Liomys irroratus
Odontacarus tubercularis
Heteromys anomalus
Odontacarus comosus novemsetus
Heteromys anomalus anomalus
Odontacarus tubercularis
Heteromys desmarestianus
Sasacarus furmani panamensis
Heteromys desmarestianus desmarestianus
Lecuwenhoekia vercammeni
Heteromys guameri
Odontacarus tubercularis
Oryzomys albigularis
Odontacarus comosus comosus
O. comosus novemsetus
O. dienteslargus
O. munchiquensis
O. vanderhammeni
O. sunnianaec
O. tiptoni
O. tubercularis
Oryzomys capito
Odontacarus tubercularis
Oryzomys concolor
Odontacarus tubercularis
Oryzomys fulvescens
Odontacarus tubercularis
Oryzomys minutus
Odontacarus comosus comosus
O. pugnosis
O. tiptoni
O. tubercularis
O. tuberculohirsutus
O. vanderhammeni
O. vergrandi
Nectomys alfari
Odontacarus tubercularis
Nectomys squamipes
Odontacarus tubercularis
Nectomys squamipes melanius
Odontacarus tubercularis
Rhipidomys venustus
Odontacarus comosus comosus
Thomasomys cinereiventer
Odontacarus munchiquensis
Thomasomys hylophilus
Odontacarus comosus comosus
O. dienteslargus
O. tubercularis
Thomasomys laniger
Odontacarus dienteslargus
O. pugnosis
O. schoenesetosus
O. tuberculohirsutus
O. vanderhammeni
O. vergrandi
Thomasomys lugens
Odontacarus schoenesetosus
O. pugnosis
O. tiptoni
O. tubercularis
Thomasomys vestitus
Odontacarus schoenesetosus
O. tiptoni
Chilomys instans
Odontacarus dienteslargus
Tylomys watsoni
Sasacarus furmani panamensis
Ototylomys phyllotis
Odontacarus chiapanensis
O. tubercularis
Peromyscus truei gratus
Odontacarus bakeri
Peromyscus guatemalensis
Odontacarus bakeri
Peromyscus leucopus
Odontacarus tubercularis
Peromyscus yucatanicus
Odontacarus chiapanensis
O. tubercularis
Reithrodontomys sp.
Odontacarus bakeri
Baiomys musculus musculus
Sasacarus furmani furmani
Baiomys taylori
Odontacarus bakeri
Akodon bogotensis
Odontacarus dienteslargus
O. tuberculohirsutus
Akodon urichi
Odontacarus tubercularis
Zygodontomys breviceauda
Odontacarus tubercularis
Chinchillula sahamae
Odontacarus kofordi
Punomys lemminus
Odontacarus kofordi
Neotomys ebriosus
Odontacarus kofordi
Sigmodon hispidus
Odontacarus sunnianaec
O. tubercularis
Sigmodomys alstoni
Odontacarus tubercularis
 Unidentified Wood Rat
Odontacarus mastigophorus
Rattus norvegicus
Odontacarus tubercularis
Rattus rattus
Odontacarus tubercularis
Rattus sp.
Odontacarus tubercularis
 Unidentified rodent. "Tepeizquite" (= *Agouti paca*?)
Odontacarus chiapanensis
Agouti paca
Odontacarus tubercularis
Dasyprocta aguti
Odontacarus tubercularis
Dasyprocta sp.
Odontacarus tubercularis

Abrocama cinerea
Odontacarus kofordi
Prochimys guyanensis
Odontacarus tubercularis
Prochimys semispinosus
Odontacarus chiapanensis
O. sunniana

O. tubercularis
Sasacarus furmani panamensis
Prochimys semispinosus panamensis
Sasacarus furmani panamensis
Order Carnivora
Felis pardalis
Odontacarus tubercularis

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